

114TH CONGRESS
1ST SESSION

H. R. 2039

To authorize the programs of the National Aeronautics and Space Administration, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 28, 2015

Mr. PALAZZO (for himself, Mr. SMITH of Texas, Mr. CULBERSON, Mr. LUCAS, Mr. BRIDENSTINE, Mr. WEBER of Texas, Mr. LOUDERMILK, Mr. ROHR-ABACHER, Mr. MCCAUL, Mr. HULTGREN, Mr. MOOLENAAR, Mr. KNIGHT, Mr. BABIN, Mrs. COMSTOCK, Mr. BROOKS of Alabama, Mr. JOHNSON of Ohio, and Mr. POSEY) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

A BILL

To authorize the programs of the National Aeronautics and Space Administration, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the
5 “National Aeronautics and Space Administration Author-
6 ization Act for 2016 and 2017”.

7 (b) TABLE OF CONTENTS.—The table of contents for
8 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

- Sec. 101. Fiscal year 2016.
- Sec. 102. Fiscal year 2017.
- Sec. 103. Budget control.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

- Sec. 201. Space exploration policy.
- Sec. 202. Stepping stone approach to exploration.
- Sec. 203. Space Launch System.
- Sec. 204. Orion crew vehicle.
- Sec. 205. Space radiation.
- Sec. 206. Planetary protection for human exploration missions.

Subtitle B—Space Operations

- Sec. 211. International Space Station.
- Sec. 212. Barriers impeding enhanced utilization of the ISS's National Laboratory by commercial companies.
- Sec. 213. Utilization of International Space Station for science missions.
- Sec. 214. International Space Station cargo resupply services lessons learned.
- Sec. 215. Commercial crew program.
- Sec. 216. Space communications.

TITLE III—SCIENCE

Subtitle A—General

- Sec. 301. Science portfolio.
- Sec. 302. Radioisotope power systems.
- Sec. 303. Congressional declaration of policy and purpose.
- Sec. 304. University class science missions.
- Sec. 305. Assessment of science mission extensions.

Subtitle B—Astrophysics

- Sec. 311. Decadal cadence.
- Sec. 312. Extrasolar planet exploration strategy.
- Sec. 313. James Webb Space Telescope.
- Sec. 314. National Reconnaissance Office telescope donation.
- Sec. 315. Wide-Field Infrared Survey Telescope.
- Sec. 316. Stratospheric Observatory for Infrared Astronomy.

Subtitle C—Planetary Science

- Sec. 321. Decadal cadence.
- Sec. 322. Near-Earth objects.
- Sec. 323. Near-Earth objects public-private partnerships.
- Sec. 324. Research on near-Earth object tsunami effects.
- Sec. 325. Astrobiology strategy.
- Sec. 326. Astrobiology public-private partnerships.
- Sec. 327. Assessment of Mars architecture.

Subtitle D—Heliophysics

- Sec. 331. Decadal cadence.
- Sec. 332. Review of space weather.

Subtitle E—Earth Science

- Sec. 341. Goal.
- Sec. 342. Decadal cadence.
- Sec. 343. Venture class missions.
- Sec. 344. Assessment.

TITLE IV—AERONAUTICS

- Sec. 401. Sense of Congress.
- Sec. 402. Aeronautics research goals.
- Sec. 403. Unmanned aerial systems research and development.
- Sec. 404. Research program on composite materials used in aeronautics.
- Sec. 405. Hypersonic research.
- Sec. 406. Supersonic research.
- Sec. 407. Research on NextGen airspace management concepts and tools.
- Sec. 408. Rotorcraft research.
- Sec. 409. Transformative aeronautics research.
- Sec. 410. Study of United States leadership in aeronautics research.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Sense of Congress.
- Sec. 502. Space Technology Program.
- Sec. 503. Utilization of the International Space Station for technology demonstrations.

TITLE VI—EDUCATION

- Sec. 601. Education.
- Sec. 602. Independent review of the National Space Grant College and Fellowship Program.
- Sec. 603. Sense of Congress.

TITLE VII—POLICY PROVISIONS

- Sec. 701. Asteroid Retrieval Mission.
- Sec. 702. Termination liability sense of Congress.
- Sec. 703. Baseline and cost controls.
- Sec. 704. Project and program reserves.
- Sec. 705. Independent reviews.
- Sec. 706. Commercial technology transfer program.
- Sec. 707. National Aeronautics and Space Administration Advisory Council.
- Sec. 708. Cost estimation.
- Sec. 709. Avoiding organizational conflicts of interest in major Administration acquisition programs.
- Sec. 710. Facilities and infrastructure.
- Sec. 711. Detection and avoidance of counterfeit electronic parts.
- Sec. 712. Space Act Agreements.
- Sec. 713. Human spaceflight accident investigations.
- Sec. 714. Fullest commercial use of space.
- Sec. 715. Orbital debris.
- Sec. 716. Review of orbital debris removal concepts.

- Sec. 717. Use of operational commercial suborbital vehicles for research, development, and education.
- Sec. 718. Fundamental space life and physical sciences research.
- Sec. 719. Restoring commitment to engineering research.
- Sec. 720. Liquid rocket engine development program.
- Sec. 721. Remote satellite servicing demonstrations.
- Sec. 722. Information technology governance.
- Sec. 723. Strengthening Administration security.
- Sec. 724. Prohibition on use of funds for contractors that have committed fraud or other crimes.
- Sec. 725. Protection of Apollo landing sites.
- Sec. 726. Astronaut occupational healthcare.
- Sec. 727. Sense of Congress on access to observational data sets.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATION.—The term “Administra-
4 tion” means the National Aeronautics and Space
5 Administration.

6 (2) ADMINISTRATOR.—The term “Adminis-
7 trator” means the Administrator of the Administra-
8 tion.

9 (3) ORION CREW VEHICLE.—The term “Orion
10 crew vehicle” means the multipurpose crew vehicle
11 described in section 303 of the National Aeronautics
12 and Space Administration Authorization Act of 2010
13 (42 U.S.C. 18323).

14 (4) SPACE ACT AGREEMENT.—The term “Space
15 Act Agreement” means an agreement created under
16 the authority to enter into “other transactions”
17 under section 20113(e) of title 51, United States
18 Code.

1 (5) SPACE LAUNCH SYSTEM.—The term “Space
2 Launch System” means the follow-on Government-
3 owned civil launch system developed, managed, and
4 operated by the Administration to serve as a key
5 component to expand human presence beyond low-
6 Earth orbit, as described in section 302 of the Na-
7 tional Aeronautics and Space Administration Au-
8 thorization Act of 2010 (42 U.S.C. 18322).

9 **TITLE I—AUTHORIZATION OF**
10 **APPROPRIATIONS**

11 **SEC. 101. FISCAL YEAR 2016.**

12 Except as provided in section 103, there are author-
13 ized to be appropriated to the Administration for fiscal
14 year 2016 \$18,529,100,000 as follows:

15 (1) For Space Exploration, \$4,953,100,000, of
16 which—

17 (A) \$1,700,000,000 shall be for the Space
18 Launch System;

19 (B) \$410,100,000 shall be for Exploration
20 Ground Systems;

21 (C) \$1,200,000,000 shall be for the Orion
22 crew vehicle;

23 (D) \$399,200,000 shall be for Exploration
24 Research and Development; and

1 (E) \$1,243,800,000 shall be for Commer-
2 cial Crew Development activities.

3 (2) For Space Operations, \$3,992,500,000.

4 (3) For Science, \$4,951,700,000, of which—

5 (A) \$1,450,000,000 shall be for Earth
6 Science;

7 (B) \$1,500,000,000 shall be for Planetary
8 Science, with up to \$30,000,000 for the
9 Astrobiology Institute;

10 (C) \$730,700,000 shall be for Astro-
11 physics;

12 (D) \$620,000,000 shall be for the James
13 Webb Space Telescope; and

14 (E) \$651,000,000 shall be for
15 Heliophysics.

16 (4) For Aeronautics, \$571,400,000.

17 (5) For Space Technology, \$596,000,000.

18 (6) For Education, \$119,000,000.

19 (7) For Safety, Security, and Mission Services,
20 \$2,843,100,000.

21 (8) For Construction and Environmental Com-
22 pliance and Restoration, \$465,300,000.

23 (9) For Inspector General, \$37,000,000.

1 **SEC. 102. FISCAL YEAR 2017.**

2 Except as provided in section 103, there are author-
3 ized to be appropriated to the Administration for fiscal
4 year 2017 \$18,807,000,000 as follows:

5 (1) For Space Exploration, \$5,268,000,000, of
6 which—

7 (A) \$1,899,600,000 shall be for the Space
8 Launch System;

9 (B) \$432,300,000 shall be for Exploration
10 Ground Systems;

11 (C) \$1,349,600,000 shall be for the Orion
12 crew vehicle;

13 (D) \$401,700,000 shall be for Exploration
14 Research and Development; and

15 (E) \$1,184,800,000 shall be for Commer-
16 cial Crew Development activities.

17 (2) For Space Operations, \$3,992,500,000.

18 (3) For Science, \$4,935,300,000, of which—

19 (A) \$1,450,000,000 shall be for Earth
20 Science;

21 (B) \$1,500,000,000 shall be for Planetary
22 Science, with up to \$30,000,000 for the
23 Astrobiology Institute;

24 (C) \$730,700,000 shall be for Astro-
25 physics;

1 (D) \$569,400,000 shall be for the James
2 Webb Space Telescope; and

3 (E) \$685,200,000 shall be for
4 Heliophysics.

5 (4) For Aeronautics, \$580,000,000.

6 (5) For Space Technology, \$596,000,000.

7 (6) For Education, \$119,000,000.

8 (7) For Safety, Security, and Mission Services,
9 \$2,843,100,000.

10 (8) For Construction and Environmental Com-
11 pliance and Restoration, \$436,100,000.

12 (9) For Inspector General, \$37,000,000.

13 **SEC. 103. BUDGET CONTROL.**

14 (a) IN GENERAL.—Except as provided in subsection
15 (b), if the applicable limits for discretionary, nonsecurity
16 purposes contained in section 251(c) of the Balanced
17 Budget and Emergency Deficit Control Act of 1985 are
18 not repealed, replaced, or modified to account for in-
19 creased allocations, and if increased allocations do not oth-
20 erwise become available through corresponding offsets
21 from within such limits, there are authorized to be appro-
22 priated to the Administration for each of fiscal years 2016
23 and 2017 \$18,010,200,000 as follows:

24 (1) For Space Exploration, \$4,845,400,000, of
25 which—

1 (A) \$1,700,000,000 shall be for the Space
2 Launch System;

3 (B) \$410,100,000 shall be for Exploration
4 Ground Systems;

5 (C) \$1,200,000,000 shall be for the Orion
6 crew vehicle;

7 (D) \$399,200,000 shall be for Exploration
8 Research and Development; and

9 (E) \$1,136,100,000 shall be for Commer-
10 cial Crew Development activities.

11 (2) For Space Operations, \$3,950,400,000.

12 (3) For Science, \$4,678,600,000, of which—

13 (A) \$1,198,500,000 shall be for Earth
14 Science;

15 (B) \$1,500,000,000 shall be for Planetary
16 Science, with up to \$30,000,000 for the
17 Astrobiology Institute;

18 (C) \$709,100,000 shall be for Astro-
19 physics;

20 (D) \$620,000,000 shall be for the James
21 Webb Space Telescope; and

22 (E) \$651,000,000 shall be for
23 Heliophysics.

24 (4) For Aeronautics, \$571,400,000.

25 (5) For Space Technology, \$500,000,000.

1 (6) For Education, \$119,000,000.

2 (7) For Safety, Security, and Mission Services,
3 \$2,843,100,000.

4 (8) For Construction and Environmental Com-
5 pliance and Restoration, \$465,300,000.

6 (9) For Inspector General, \$37,000,000.

7 (b) EXCEPTION.—If increased allocations described
8 in subsection (a) become available in an amount that is
9 not sufficient to accommodate the authorization levels
10 specified in sections 101 and 102, there are authorized
11 to be appropriated to the Administration for each of fiscal
12 years 2016 and 2017 the amounts that such increased al-
13 locations do accommodate. Any increases in authorizations
14 under this subsection above the amounts specified in sub-
15 section (a) shall be allocated proportionately among the
16 accounts specified in this title, except that in no event
17 shall an authorized amount exceed any amount specified
18 in section 101 or 102.

19 **TITLE II—HUMAN SPACE FLIGHT**
20 **Subtitle A—Exploration**

21 **SEC. 201. SPACE EXPLORATION POLICY.**

22 (a) POLICY.—Human exploration deeper into the
23 Solar System shall be a core mission of the Administra-
24 tion. It is the policy of the United States that the goal
25 of the Administration’s exploration program shall be to

1 successfully conduct a crewed mission to the surface of
2 Mars to begin human exploration of that planet. The use
3 of the surface of the Moon, cis-lunar space, near-Earth
4 asteroids, Lagrangian points, and Martian moons may be
5 pursued provided they are properly incorporated into the
6 Human Exploration Roadmap described in section 70504
7 of title 51, United States Code.

8 (b) VISION FOR SPACE EXPLORATION.—Section
9 20302 of title 51, United States Code, is amended by add-
10 ing at the end the following:

11 “(c) DEFINITIONS.—In this section:

12 “(1) ORION CREW VEHICLE.—The term ‘Orion
13 crew vehicle’ means the multipurpose crew vehicle
14 described in section 303 of the National Aeronautics
15 and Space Administration Authorization Act of 2010
16 (42 U.S.C. 18323).

17 “(2) SPACE LAUNCH SYSTEM.—The term
18 ‘Space Launch System’ means the follow-on Govern-
19 ment-owned civil launch system developed, managed,
20 and operated by the Administration to serve as a
21 key component to expand human presence beyond
22 low-Earth orbit, as described in section 302 of the
23 National Aeronautics and Space Administration Au-
24 thorization Act of 2010 (42 U.S.C. 18322).”.

1 (c) KEY OBJECTIVES.—Section 202(b) of the Na-
2 tional Aeronautics and Space Administration Authoriza-
3 tion Act of 2010 (42 U.S.C. 18312(b)) is amended—

4 (1) in paragraph (3), by striking “and” after
5 the semicolon;

6 (2) in paragraph (4), by striking the period at
7 the end and inserting “; and”; and

8 (3) by adding at the end the following:

9 “(5) to accelerate the development of capabili-
10 ties to enable a human exploration mission to the
11 surface of Mars and beyond through the
12 prioritization of those technologies and capabilities
13 best suited for such a mission in accordance with the
14 Human Exploration Roadmap under section 70504
15 of title 51, United States Code.”.

16 (d) USE OF NON-UNITED STATES HUMAN SPACE
17 FLIGHT TRANSPORTATION CAPABILITIES.—Section
18 201(a) of the National Aeronautics and Space Administra-
19 tion Authorization Act of 2010 (42 U.S.C. 18311(a)) is
20 amended to read as follows:

21 “(a) USE OF NON-UNITED STATES HUMAN SPACE
22 FLIGHT TRANSPORTATION CAPABILITIES.—

23 “(1) IN GENERAL.—NASA may not obtain non-
24 United States human space flight capabilities unless
25 no domestic commercial or public-private partnership

1 provider that the Administrator has determined to
2 meet safety and affordability requirements estab-
3 lished by NASA for the transport of its astronauts
4 is available to provide such capabilities.

5 “(2) DEFINITION.—For purposes of this sub-
6 section, the term ‘domestic commercial provider’
7 means a person providing space transportation serv-
8 ices or other space-related activities, the majority
9 control of which is held by persons other than a
10 Federal, State, local, or foreign government, foreign
11 company, or foreign national.”.

12 (e) REPEAL OF SPACE SHUTTLE CAPABILITY ASSUR-
13 ANCE.—Section 203 of the National Aeronautics and
14 Space Administration Authorization Act of 2010 (42
15 U.S.C. 18313) is amended—

16 (1) by striking subsection (b);

17 (2) in subsection (d), by striking “subsection
18 (c)” and inserting “subsection (b)”; and

19 (3) by redesignating subsections (c) and (d) as
20 subsections (b) and (c), respectively.

21 **SEC. 202. STEPPING STONE APPROACH TO EXPLORATION.**

22 (a) IN GENERAL.—Section 70504 of title 51, United
23 States Code, is amended to read as follows:

1 **“§ 70504. Stepping stone approach to exploration**

2 “(a) IN GENERAL.—In order to maximize the cost
3 effectiveness of the long-term space exploration and utili-
4 zation activities of the United States, the Administrator
5 shall direct the Human Exploration and Operations Mis-
6 sion Directorate, or its successor division, to develop a
7 Human Exploration Roadmap to define the specific capa-
8 bilities and technologies necessary to extend human pres-
9 ence to the surface of Mars and the sets and sequences
10 of missions required to demonstrate such capabilities and
11 technologies.

12 “(b) INTERNATIONAL PARTICIPATION.—The Presi-
13 dent should invite the United States partners in the Inter-
14 national Space Station program and other nations, as ap-
15 propriate, to participate in an international initiative
16 under the leadership of the United States to achieve the
17 goal of successfully conducting a crewed mission to the
18 surface of Mars.

19 “(c) ROADMAP REQUIREMENTS.—In developing the
20 Human Exploration Roadmap, the Administrator shall—

21 “(1) include the specific set of capabilities and
22 technologies that contribute to extending human
23 presence to the surface of Mars and the sets and se-
24 quences of missions necessary to demonstrate the
25 proficiency of these capabilities and technologies
26 with an emphasis on using or not using the Inter-

1 national Space Station, lunar landings, cis-lunar
2 space, trans-lunar space, Lagrangian points, and the
3 natural satellites of Mars, Phobos and Deimos, as
4 testbeds, as necessary, and shall include the most
5 appropriate process for developing such capabilities
6 and technologies;

7 “(2) include information on the phasing of
8 planned intermediate destinations, Mars mission risk
9 areas and potential risk mitigation approaches, tech-
10 nology requirements and phasing of required tech-
11 nology development activities, the management strat-
12 egy to be followed, related International Space Sta-
13 tion activities, and planned international collabo-
14 rative activities, potential commercial contributions,
15 and other activities relevant to the achievement of
16 the goal established in section 201(a) of the Na-
17 tional Aeronautics and Space Administration Au-
18 thorization Act for 2016 and 2017;

19 “(3) describe those technologies already under
20 development across the Federal Government or by
21 nongovernment entities which meet or exceed the
22 needs described in paragraph (1);

23 “(4) provide a specific process for the evolution
24 of the capabilities of the fully integrated Orion crew
25 vehicle with the Space Launch System and how

1 these systems demonstrate the capabilities and tech-
2 nologies described in paragraph (1);

3 “(5) provide a description of the capabilities
4 and technologies that need to be demonstrated or re-
5 search data that could be gained through the utiliza-
6 tion of the International Space Station and the sta-
7 tus of the development of such capabilities and tech-
8 nologies;

9 “(6) describe a framework for international co-
10 operation in the development of all technologies and
11 capabilities required in this section, as well as an as-
12 sessment of the risks posed by relying on inter-
13 national partners for capabilities and technologies on
14 the critical path of development;

15 “(7) describe a process for utilizing nongovern-
16 mental entities for future human exploration beyond
17 lunar landings and cis-lunar space and specify what,
18 if any, synergy could be gained from—

19 “(A) partnerships using Space Act Agree-
20 ments (as defined in section 2 of the National
21 Aeronautics and Space Administration Author-
22 ization Act for 2016 and 2017); or

23 “(B) other acquisition instruments;

24 “(8) include in the Human Exploration Road-
25 map an addendum from the National Aeronautics

1 and Space Administration Advisory Council, and an
2 addendum from the Aerospace Safety Advisory
3 Panel, each with a statement of review of the
4 Human Exploration Roadmap that shall include—

5 “(A) subjects of agreement;

6 “(B) areas of concern; and

7 “(C) recommendations; and

8 “(9) include in the Human Exploration Road-
9 map an examination of the benefits of utilizing cur-
10 rent Administration launch facilities for trans-lunar
11 missions.

12 “(d) UPDATES.—The Administrator shall update
13 such Human Exploration Roadmap as needed but no less
14 frequently than every 2 years and include it in the budget
15 for that fiscal year transmitted to Congress under section
16 1105(a) of title 31, and describe—

17 “(1) the achievements and goals reached in the
18 process of developing such capabilities and tech-
19 nologies during the 2-year period prior to the sub-
20 mission of the update to Congress; and

21 “(2) the expected goals and achievements in the
22 following 2-year period.

23 “(e) DEFINITIONS.—In this section, the terms ‘Orion
24 crew vehicle’ and ‘Space Launch System’ have the mean-
25 ings given such terms in section 20302.”.

1 (b) REPORT.—

2 (1) IN GENERAL.—Not later than 180 days
3 after the date of enactment of this Act, the Adminis-
4 trator shall transmit a copy of the Human Explo-
5 ration Roadmap developed under section 70504 of
6 title 51, United States Code, to the Committee on
7 Science, Space, and Technology of the House of
8 Representatives and the Committee on Commerce,
9 Science, and Transportation of the Senate.

10 (2) UPDATES.—The Administrator shall trans-
11 mit a copy of each updated Human Exploration
12 Roadmap to the Committee on Science, Space, and
13 Technology of the House of Representatives and the
14 Committee on Commerce, Science, and Transpor-
15 tation of the Senate not later than 7 days after such
16 Human Exploration Roadmap is updated.

17 **SEC. 203. SPACE LAUNCH SYSTEM.**

18 (a) FINDINGS.—Congress finds that—

19 (1) the Space Launch System is the most prac-
20 tical approach to reaching the Moon, Mars, and be-
21 yond, and Congress reaffirms the policy and min-
22 imum capability requirements for the Space Launch
23 System contained in section 302 of the National
24 Aeronautics and Space Administration Authorization
25 Act of 2010 (42 U.S.C. 18322);

1 (2) the primary goal for the design of the fully
2 integrated Space Launch System, including an
3 upper stage needed to go beyond low-Earth orbit, is
4 to safely carry a total payload to enable human
5 space exploration of the Moon, Mars, and beyond
6 over the course of the next century as required in
7 section 302(c) of the National Aeronautics and
8 Space Administration Authorization Act of 2010 (42
9 U.S.C. 18322(c)); and

10 (3) in order to promote safety and reduce pro-
11 grammatic risk, the Administrator shall budget for
12 and undertake a robust ground test and uncrewed
13 and crewed flight test and demonstration program
14 for the Space Launch System and the Orion crew
15 vehicle and shall budget for an operational flight
16 rate sufficient to maintain safety and operational
17 readiness.

18 (b) SENSE OF CONGRESS.—It is the sense of Con-
19 gress that the President’s annual budget requests for the
20 Space Launch System and Orion crew vehicle develop-
21 ment, test, and operational phases should strive to accu-
22 rately reflect the resource requirements of each of those
23 phases, consistent with the policy established in section
24 201(a) of this Act.

1 (c) IN GENERAL.—Given the critical importance of
2 a heavy-lift launch vehicle and crewed spacecraft to enable
3 the achievement of the goal established in section 201(a)
4 of this Act, as well as the accomplishment of intermediate
5 exploration milestones and the provision of a backup capa-
6 bility to transfer crew and cargo to the International
7 Space Station, the Administrator shall make the expedi-
8 tious development, test, and achievement of operational
9 readiness of the Space Launch System and the Orion crew
10 vehicle the highest priority of the exploration program.

11 (d) GOVERNMENT ACCOUNTABILITY OFFICE RE-
12 VIEW.—Not later than 270 days after the date of enact-
13 ment of this Act, the Comptroller General shall transmit
14 to the Committee on Science, Space, and Technology of
15 the House of Representatives and the Committee on Com-
16 merce, Science, and Transportation of the Senate a report
17 on the Administration’s acquisition of ground systems in
18 support of the Space Launch System. The report shall as-
19 sess the extent to which ground systems acquired in sup-
20 port of the Space Launch System are focused on the direct
21 support of the Space Launch System and shall identify
22 any ground support projects or activities that the Admin-
23 istration is undertaking that do not solely or primarily
24 support the Space Launch System.

1 (e) UTILIZATION REPORT.—The Administrator, in
2 consultation with the Secretary of Defense and the Direc-
3 tor of National Intelligence, shall prepare a report that
4 addresses the effort and budget required to enable and
5 utilize a cargo variant of the 130-ton Space Launch Sys-
6 tem configuration described in section 302(c) of the Na-
7 tional Aeronautics and Space Administration Authoriza-
8 tion Act of 2010 (42 U.S.C. 18322(c)). This report shall
9 also include consideration of the technical requirements of
10 the scientific and national security communities related to
11 such Space Launch System and shall directly assess the
12 utility and estimated cost savings obtained by using such
13 Space Launch System for national security and space
14 science missions. The Administrator shall transmit such
15 report to the Committee on Science, Space, and Tech-
16 nology of the House of Representatives and the Committee
17 on Commerce, Science, and Transportation of the Senate
18 not later than 180 days after the date of enactment of
19 this Act.

20 (f) NAMING COMPETITION.—Beginning not later
21 than 180 days after the date of enactment of this Act and
22 concluding not later than 1 year after such date of enact-
23 ment, the Administrator shall conduct a well-publicized
24 competition among students in elementary and secondary

1 schools to name the elements of the Administration’s ex-
2 ploration program, including—

3 (1) a name for the deep space human explo-
4 ration program as a whole, which includes the Space
5 Launch System, the Orion crew vehicle, and future
6 missions; and

7 (2) a name for the Space Launch System.

8 (g) ADVANCED BOOSTER COMPETITION.—

9 (1) REPORT.—Not later than 90 days after the
10 date of enactment of this Act, the Associate Admin-
11 istrator of the Administration shall transmit to the
12 Committee on Science, Space, and Technology of the
13 House of Representatives and the Committee on
14 Commerce, Science, and Transportation of the Sen-
15 ate a report that—

16 (A) describes the estimated total develop-
17 ment cost of an advanced booster for the Space
18 Launch System;

19 (B) details any reductions or increases to
20 the development cost of the Space Launch Sys-
21 tem which may result from conducting a com-
22 petition for an advanced booster; and

23 (C) outlines any potential schedule delay to
24 the Space Launch System 2018 Exploration
25 Mission–1 launch as a result of increased costs

1 associated with conducting a competition for an
2 advanced booster.

3 (2) COMPETITION.—If the Associate Adminis-
4 trator reports reductions pursuant to paragraph
5 (1)(B), and no adverse schedule impact pursuant to
6 paragraph (1)(C), then the Administration shall con-
7 duct a full and open competition for an advanced
8 booster for the Space Launch System to meet the
9 requirements described in section 302(c) of the Na-
10 tional Aeronautics and Space Administration Au-
11 thorization Act of 2010 (42 U.S.C. 18322(c)), to
12 begin as soon as practicable after the development of
13 the upper stage has been initiated.

14 **SEC. 204. ORION CREW VEHICLE.**

15 (a) IN GENERAL.—The Orion crew vehicle shall meet
16 the needs and the minimum capability requirements de-
17 scribed in section 303 of the National Aeronautics and
18 Space Administration Authorization Act of 2010 (42
19 U.S.C. 18323).

20 (b) REPORT.—Not later than 60 days after the date
21 of enactment of this Act, the Administrator shall transmit
22 a report to the Committee on Science, Space, and Tech-
23 nology of the House of Representatives and the Committee
24 on Commerce, Science, and Transportation of the Sen-
25 ate—

1 (1) detailing those components and systems of
2 the Orion crew vehicle that ensure it is in compli-
3 ance with section 303(b) of such Act (42 U.S.C.
4 18323(b));

5 (2) detailing the expected date that the Orion
6 crew vehicle will be available to transport crew and
7 cargo to the International Space Station; and

8 (3) certifying that the requirements of section
9 303(b)(3) of such Act (42 U.S.C. 18323(b)(3)) will
10 be met by the Administration.

11 **SEC. 205. SPACE RADIATION.**

12 (a) STRATEGY AND PLAN.—

13 (1) IN GENERAL.—The Administrator shall de-
14 velop a space radiation mitigation and management
15 strategy and implementation plan to enable the
16 achievement of the goal established in section 201
17 that includes key research and monitoring require-
18 ments, milestones, a timetable, and an estimate of
19 facility and budgetary requirements.

20 (2) COORDINATION.—The strategy shall include
21 a mechanism for coordinating Administration re-
22 search, technology, facilities, engineering, operations,
23 and other functions required to support the strategy
24 and plan.

1 (3) TRANSMITTAL.—Not later than 1 year after
2 the date of enactment of this Act, the Administrator
3 shall transmit the strategy and plan to the Com-
4 mittee on Science, Space, and Technology of the
5 House of Representatives and the Committee on
6 Commerce, Science, and Transportation of the Sen-
7 ate.

8 (b) SPACE RADIATION RESEARCH FACILITIES.—The
9 Administrator, in consultation with the heads of other ap-
10 propriate Federal agencies, shall assess the national capa-
11 bilities for carrying out critical ground-based research on
12 space radiation biology and shall identify any issues that
13 could affect the ability to carry out that research.

14 **SEC. 206. PLANETARY PROTECTION FOR HUMAN EXPLO-**
15 **RATION MISSIONS.**

16 (a) STUDY.—The Administrator shall enter into an
17 arrangement with the National Academies for a study to
18 explore the planetary protection ramifications of potential
19 future missions by astronauts such as to the lunar polar
20 regions, near-Earth asteroids, the moons of Mars, and the
21 surface of Mars.

22 (b) SCOPE.—The study shall—

23 (1) collate and summarize what has been done
24 to date with respect to planetary protection meas-
25 ures to be applied to potential human missions such

1 as to the lunar polar regions, near-Earth asteroids,
2 the moons of Mars, and the surface of Mars;

3 (2) identify and document planetary protection
4 concerns associated with potential human missions
5 such as to the lunar polar regions, near-Earth aster-
6 oids, the moons of Mars, and the surface of Mars;

7 (3) develop a methodology, if possible, for defin-
8 ing and classifying the degree of concern associated
9 with each likely destination;

10 (4) assess likely methodologies for addressing
11 planetary protection concerns; and

12 (5) identify areas for future research to reduce
13 current uncertainties.

14 (c) COMPLETION DATE.—Not later than 2 years
15 after the date of enactment of this Act, the Administrator
16 shall provide the results of the study to the Committee
17 on Science, Space, and Technology of the House of Rep-
18 resentatives and the Committee on Commerce, Science,
19 and Transportation of the Senate.

20 **Subtitle B—Space Operations**

21 **SEC. 211. INTERNATIONAL SPACE STATION.**

22 (a) FINDINGS.—Congress finds the following:

23 (1) The International Space Station is an ideal
24 testbed for future exploration systems development,
25 including long-duration space travel.

1 (2) The use of the private market to provide
2 cargo and crew transportation services is currently
3 the most expeditious process to restore domestic ac-
4 cess to the International Space Station and low-
5 Earth orbit.

6 (3) Government access to low-Earth orbit is
7 paramount to the continued success of the Inter-
8 national Space Station and National Laboratory.

9 (b) IN GENERAL.—The following is the policy of the
10 United States:

11 (1) The United States International Space Sta-
12 tion program shall have two primary objectives: sup-
13 porting achievement of the goal established in sec-
14 tion 201 of this Act and pursuing a research pro-
15 gram that advances knowledge and provides benefits
16 to the Nation. It shall continue to be the policy of
17 the United States to, in consultation with its inter-
18 national partners in the International Space Station
19 program, support full and complete utilization of the
20 International Space Station.

21 (2) The International Space Station shall be
22 utilized to the maximum extent practicable for the
23 development of capabilities and technologies needed
24 for the future of human exploration beyond low-
25 Earth orbit and shall be considered in the develop-

1 ment of the Human Exploration Roadmap developed
2 under section 70504 of title 51, United States Code.

3 (3) The Administrator shall, in consultation
4 with the International Space Station partners—

5 (A) take all necessary measures to support
6 the operation and full utilization of the Inter-
7 national Space Station; and

8 (B) seek to minimize, to the extent prac-
9 ticable, the operating costs of the International
10 Space Station.

11 (4) Reliance on foreign carriers for crew trans-
12 fer is unacceptable, and the Nation's human space
13 flight program must acquire the capability to launch
14 United States astronauts on United States rockets
15 from United States soil as soon as is safe and prac-
16 tically possible, whether on Government-owned and
17 operated space transportation systems or privately
18 owned systems that have been certified for flight by
19 the appropriate Federal agencies.

20 (c) REAFFIRMATION OF POLICY.—Congress reaf-
21 firms—

22 (1) its commitment to the development of a
23 commercially developed launch and delivery system
24 to the International Space Station for crew missions
25 as expressed in the National Aeronautics and Space

1 Administration Authorization Act of 2005 (Public
2 Law 109–155), the National Aeronautics and Space
3 Administration Authorization Act of 2008 (Public
4 Law 110–422), and the National Aeronautics and
5 Space Administration Authorization Act of 2010
6 (Public Law 111–267);

7 (2) that the Administration shall make use of
8 United States commercially provided International
9 Space Station crew transfer and crew rescue services
10 to the maximum extent practicable;

11 (3) that the Orion crew vehicle shall provide an
12 alternative means of delivery of crew and cargo to
13 the International Space Station, in the event other
14 vehicles, whether commercial vehicles or partner-sup-
15 plied vehicles, are unable to perform that function;
16 and

17 (4) the policy stated in section 501(b) of the
18 National Aeronautics and Space Administration Au-
19 thorization Act of 2010 (42 U.S.C. 18351(b)) that
20 the Administration shall pursue international, com-
21 mercial, and intragovernmental means to maximize
22 International Space Station logistics supply, mainte-
23 nance, and operational capabilities, reduce risks to
24 International Space Station systems sustainability,

1 and offset and minimize United States operations
2 costs relating to the International Space Station.

3 (d) ASSURED ACCESS TO LOW-EARTH ORBIT.—Sec-
4 tion 70501(a) of title 51, United States Code, is amended
5 to read as follows:

6 “(a) POLICY STATEMENT.—It is the policy of the
7 United States to maintain an uninterrupted capability for
8 human space flight and operations in low-Earth orbit, and
9 beyond, as an essential instrument of national security
10 and the capability to ensure continued United States par-
11 ticipation and leadership in the exploration and utilization
12 of space.”.

13 (e) REPEALS.—

14 (1) USE OF SPACE SHUTTLE OR ALTER-
15 NATIVES.—Chapter 701 of title 51, United States
16 Code, and the item relating to such chapter in the
17 table of chapters for such title, are repealed.

18 (2) SHUTTLE PRICING POLICY FOR COMMER-
19 CIAL AND FOREIGN USERS.—Chapter 703 of title
20 51, United States Code, and the item relating to
21 such chapter in the table of chapters for such title,
22 are repealed.

23 (3) SHUTTLE PRIVATIZATION.—Section 50133
24 of title 51, United States Code, and the item relat-

1 ing to such section in the table of sections for chap-
2 ter 501 of such title, are repealed.

3 (f) EXTENSION CRITERIA REPORT.—Not later than
4 1 year after the date of enactment of this Act, the Admin-
5 istrator shall submit to the Committee on Science, Space,
6 and Technology of the House of Representatives and the
7 Committee on Commerce, Science, and Transportation of
8 the Senate a report on the feasibility of extending the op-
9 eration of the International Space Station that includes—

10 (1) criteria for defining the International Space
11 Station as a research success;

12 (2) any necessary contributions to enabling exe-
13 cution of the Human Exploration Roadmap devel-
14 oped under section 70504 of title 51, United States
15 Code;

16 (3) cost estimates for operating the Inter-
17 national Space Station to achieve the criteria re-
18 quired under paragraph (1);

19 (4) cost estimates for extending operations to
20 2024 and 2030;

21 (5) an assessment of how the defined criteria
22 under paragraph (1) respond to the National Acad-
23 emies Decadal Survey on Biological and Physical
24 Sciences in Space; and

1 (6) an identification of the actions and cost es-
2 timate needed to deorbit the International Space
3 Station once a decision is made to deorbit the lab-
4 oratory.

5 (g) STRATEGIC PLAN FOR INTERNATIONAL SPACE
6 STATION RESEARCH.—

7 (1) IN GENERAL.—The Director of the Office of
8 Science and Technology Policy, in consultation with
9 the Administrator, academia, other Federal agencies,
10 the International Space Station National Laboratory
11 Advisory Committee, and other potential stake-
12 holders, shall develop and transmit to the Committee
13 on Science, Space, and Technology of the House of
14 Representatives and the Committee on Commerce,
15 Science, and Transportation of the Senate a stra-
16 tegic plan for conducting competitive, peer-reviewed
17 research in physical and life sciences and related
18 technologies on the International Space Station
19 through at least 2020.

20 (2) PLAN REQUIREMENTS.—The strategic plan
21 shall—

22 (A) be consistent with the priorities and
23 recommendations established by the National
24 Academies in its Decadal Survey on Biological
25 and Physical Sciences in Space;

1 (B) provide a research timeline and iden-
2 tify resource requirements for its implementa-
3 tion, including the facilities and instrumenta-
4 tion necessary for the conduct of such research;
5 and

6 (C) identify—

7 (i) criteria for the proposed research,
8 including—

9 (I) a justification for the research
10 to be carried out in the space micro-
11 gravity environment;

12 (II) the use of model systems;

13 (III) the testing of flight hard-
14 ware to understand and ensure its
15 functioning in the microgravity envi-
16 ronment;

17 (IV) the use of controls to help
18 distinguish among the direct and indi-
19 rect effects of microgravity, among
20 other effects of the flight or space en-
21 vironment;

22 (V) approaches for facilitating
23 data collection, analysis, and interpre-
24 tation;

1 (VI) procedures to ensure repeti-
2 tion of experiments, as needed;

3 (VII) support for timely presen-
4 tation of the peer-reviewed results of
5 the research;

6 (VIII) defined metrics for the
7 success of each study; and

8 (IX) how these activities enable
9 the Human Exploration Roadmap de-
10 scribed in section 70504 of title 51,
11 United States Code;

12 (ii) instrumentation required to sup-
13 port the measurements and analysis of the
14 research to be carried out under the stra-
15 tegic plan;

16 (iii) the capabilities needed to support
17 direct, real-time communications between
18 astronauts working on research experi-
19 ments onboard the International Space
20 Station and the principal investigator on
21 the ground;

22 (iv) a process for involving the exter-
23 nal user community in research planning,
24 including planning for relevant flight hard-
25 ware and instrumentation, and for utiliza-

1 tion of the International Space Station,
2 free flyers, or other research platforms;

3 (v) the acquisition strategy the Ad-
4 ministration plans to use to acquire any
5 new support capabilities which are not
6 operational on the International Space Sta-
7 tion as of the date of enactment of this
8 Act, and the criteria the Administration
9 will apply if less than full and open com-
10 petition is selected; and

11 (vi) defined metrics for success of the
12 research plan.

13 **SEC. 212. BARRIERS IMPEDING ENHANCED UTILIZATION OF**
14 **THE ISS'S NATIONAL LABORATORY BY COM-**
15 **MERCIAL COMPANIES.**

16 (a) SENSE OF CONGRESS.—It is the sense of Con-
17 gress that—

18 (1) enhanced utilization of the International
19 Space Station's National Laboratory requires a full
20 understanding of the barriers impeding such utiliza-
21 tion and actions needed to be taken to remove or
22 mitigate them to the maximum extent practicable;
23 and

24 (2) doing so will allow the Administration to en-
25 courage commercial companies to invest in micro-

1 gravity research using National Laboratory research
2 facilities.

3 (b) ASSESSMENT.—The Administrator shall enter
4 into an arrangement with the National Academies for an
5 assessment to—

6 (1) identify barriers impeding enhanced utiliza-
7 tion of the International Space Station’s National
8 Laboratory;

9 (2) recommend ways to encourage commercial
10 companies to make greater use of the International
11 Space Station’s National Laboratory, including cor-
12 porate investment in microgravity research; and

13 (3) identify any legislative changes that may be
14 required.

15 (c) TRANSMITTAL.—Not later than 1 year after the
16 date of enactment of this Act, the Administrator shall
17 transmit to the Committee on Science, Space, and Tech-
18 nology of the House of Representatives and the Committee
19 on Commerce, Science, and Transportation of the Senate
20 the results of the assessment described in subsection (b).

21 **SEC. 213. UTILIZATION OF INTERNATIONAL SPACE STA-**
22 **TION FOR SCIENCE MISSIONS.**

23 The Administrator shall utilize the International
24 Space Station for Science Mission Directorate missions in

1 low-Earth orbit wherever it is practical and cost effective
2 to do so.

3 **SEC. 214. INTERNATIONAL SPACE STATION CARGO RESUP-**
4 **PLY SERVICES LESSONS LEARNED.**

5 Not later than 120 days after the date of enactment
6 of this Act, the Administrator shall transmit a report to
7 the Committee on Science, Space, and Technology of the
8 House of Representatives and the Committee on Com-
9 merce, Science, and Transportation of the Senate that—

10 (1) identifies the lessons learned to date from
11 the Commercial Resupply Services contract;

12 (2) indicates whether changes are needed to the
13 manner in which the Administration procures and
14 manages similar services upon the expiration of the
15 existing Commercial Resupply Services contract; and

16 (3) identifies any lessons learned from the Com-
17 mercial Resupply Services contract that should be
18 applied to the procurement and management of com-
19 mercially provided crew transfer services to and
20 from the International Space Station.

21 **SEC. 215. COMMERCIAL CREW PROGRAM.**

22 (a) SENSE OF CONGRESS.—It is the sense of Con-
23 gress that once developed and certified to meet the Admin-
24 istration’s safety and reliability requirements, United
25 States commercially provided crew transportation systems

1 offer the potential of serving as the primary means of
2 transporting American astronauts and international part-
3 ner astronauts to and from the International Space Sta-
4 tion and serving as International Space Station emergency
5 crew rescue vehicles. At the same time, the budgetary as-
6 sumptions used by the Administration in its planning for
7 the Commercial Crew Program have consistently assumed
8 significantly higher funding levels than have been author-
9 ized and appropriated by Congress. It is the sense of Con-
10 gress that credibility in the Administration's budgetary es-
11 timates for the Commercial Crew Program can be en-
12 hanced by an independently developed cost estimate. Such
13 credibility in budgetary estimates is an important factor
14 in understanding program risk.

15 (b) OBJECTIVE.—The objective of the Administra-
16 tion's Commercial Crew Program shall be to assist the de-
17 velopment of at least one crew transportation system to
18 carry Administration astronauts safely, reliably, and
19 affordably to and from the International Space Station
20 and to serve as an emergency crew rescue vehicle as soon
21 as practicable within the funding levels authorized. The
22 Administration shall not use any considerations beyond
23 this objective in the overall acquisition strategy.

24 (c) SAFETY.—Consistent with the findings and rec-
25 ommendations of the Columbia Accident Investigation

1 Board, the Administration shall ensure that safety and the
2 minimization of the probability of loss of crew are the
3 highest priorities of the commercial crew transportation
4 program.

5 (d) COST MINIMIZATION.—The Administrator shall
6 strive through the competitive selection process to mini-
7 mize the life cycle cost to the Administration through the
8 planned period of commercially provided crew transpor-
9 tation services.

10 (e) TRANSPARENCY.—Transparency is the corner-
11 stone of ensuring a safe and reliable commercial crew
12 transportation service to the International Space Station.
13 The Administrator shall, to the greatest extent prac-
14 ticable, ensure that every commercial crew transportation
15 services provider has provided evidence-based support for
16 their costs and schedule.

17 (f) INDEPENDENT COST AND SCHEDULE ESTI-
18 MATE.—

19 (1) REQUIREMENT.—Not later than 60 days
20 after the date of enactment of this Act, the Adminis-
21 trator shall arrange for the initiation of an Inde-
22 pendent Cost and Schedule Estimate for—

23 (A) all activities associated with the devel-
24 opment, test, demonstration, and certification
25 of commercial crew transportation systems;

1 (B) transportation and rescue services re-
2 quired by the Administration for International
3 Space Station operations through calendar year
4 2020 or later if Administration requirements so
5 dictate; and

6 (C) the estimated date of operational read-
7 iness for the program.

8 (2) TRANSMITTAL.—Not later than 180 days
9 after initiation of the Independent Cost and Sched-
10 ule Estimate under paragraph (1), the Adminis-
11 trator shall transmit the results of the Independent
12 Cost and Schedule Estimate to the Committee on
13 Science, Space, and Technology of the House of
14 Representatives and the Committee on Commerce,
15 Science, and Transportation of the Senate.

16 **SEC. 216. SPACE COMMUNICATIONS.**

17 (a) PLAN.—The Administrator shall develop a plan,
18 in consultation with relevant Federal agencies, for updat-
19 ing the Administration’s space communications and navi-
20 gation architecture for low-Earth orbital and deep space
21 operations so that it is capable of meeting the Administra-
22 tion’s communications needs over the next 20 years. The
23 plan shall include lifecycle cost estimates, milestones, esti-
24 mated performance capabilities, and 5-year funding pro-
25 files. The plan shall also include an estimate of the

1 amounts of any reimbursements the Administration is
2 likely to receive from other Federal agencies during the
3 expected life of the upgrades described in the plan. At a
4 minimum, the plan shall include a description of the fol-
5 lowing:

6 (1) Steps to sustain the existing space commu-
7 nications and navigation network and infrastructure
8 and priorities for how resources will be applied and
9 cost estimates for the maintenance of existing space
10 communications network capabilities.

11 (2) Upgrades needed to support space commu-
12 nications and navigation network and infrastructure
13 requirements, including cost estimates and schedules
14 and an assessment of the impact on missions if re-
15 sources are not secured at the level needed.

16 (3) Projected space communications and navi-
17 gation network requirements for the next 20 years,
18 including those in support of human space explo-
19 ration missions.

20 (4) Projected Tracking and Data Relay Sat-
21 ellite System requirements for the next 20 years, in-
22 cluding those in support of other relevant Federal
23 agencies, and cost and schedule estimates to main-
24 tain and upgrade the Tracking and Data Relay Sat-
25 ellite System to meet projected requirements.

1 (5) Steps the Administration is taking to meet
2 future space communications requirements after all
3 Tracking and Data Relay Satellite System third-gen-
4 eration communications satellites are operational.

5 (6) Steps the Administration is taking to miti-
6 gate threats to electromagnetic spectrum use.

7 (b) SCHEDULE.—The Administrator shall transmit
8 the plan developed under this section to the Committee
9 on Science, Space, and Technology of the House of Rep-
10 resentatives and the Committee on Commerce, Science,
11 and Transportation of the Senate not later than 1 year
12 after the date of enactment of this Act.

13 **TITLE III—SCIENCE**

14 **Subtitle A—General**

15 **SEC. 301. SCIENCE PORTFOLIO.**

16 (a) BALANCED AND ADEQUATELY FUNDED ACTIVI-
17 TIES.—Section 803 of the National Aeronautics and Space
18 Administration Authorization Act of 2010 (124 Stat.
19 2832) is amended to read as follows:

20 **“SEC. 803. OVERALL SCIENCE PORTFOLIO—SENSE OF THE**
21 **CONGRESS.**

22 “Congress reaffirms its sense, expressed in the Na-
23 tional Aeronautics and Space Administration Authoriza-
24 tion Act of 2010, that a balanced and adequately funded
25 set of activities, consisting of research and analysis grants

1 programs, technology development, small, medium, and
2 large space missions, and suborbital research activities,
3 contributes to a robust and productive science program
4 and serves as a catalyst for innovation and discovery.”.

5 (b) DECADAL SURVEYS.—In proposing the funding
6 of programs and activities for the Administration for each
7 fiscal year, the Administrator shall, to the greatest extent
8 practicable, follow guidance provided in the current
9 decadal surveys from the National Academies’ Space
10 Studies Board.

11 **SEC. 302. RADIOISOTOPE POWER SYSTEMS.**

12 (a) SENSE OF CONGRESS.—It is the sense of Con-
13 gress that conducting deep space exploration requires ra-
14 dioisotope power systems, and establishing continuity in
15 the production of the material needed to power these sys-
16 tems is paramount to the success of these future deep
17 space missions. It is further the sense of Congress that
18 Federal agencies supporting the Administration through
19 the production of such material should do so in a cost ef-
20 fective manner so as not to impose excessive reimburse-
21 ment requirements on the Administration.

22 (b) ANALYSIS OF REQUIREMENTS AND RISKS.—The
23 Director of the Office of Science and Technology Policy
24 and the Administrator, in consultation with other Federal
25 agencies, shall conduct an analysis of—

1 (1) the requirements of the Administration for
2 radioisotope power system material that is needed to
3 carry out planned, high priority robotic missions in
4 the solar system and other surface exploration activi-
5 ties beyond low-Earth orbit; and

6 (2) the risks to missions of the Administration
7 in meeting those requirements, or any additional re-
8 quirements, due to a lack of adequate radioisotope
9 power system material.

10 (c) CONTENTS OF ANALYSIS.—The analysis con-
11 ducted under subsection (b) shall—

12 (1) detail the Administration’s current pro-
13 jected mission requirements and associated time-
14 frames for radioisotope power system material;

15 (2) explain the assumptions used to determine
16 the Administration’s requirements for the material,
17 including—

18 (A) the planned use of advanced thermal
19 conversion technology such as advanced
20 thermocouples and Stirling generators and con-
21 verters; and

22 (B) the risks and implications of, and con-
23 tingencies for, any delays or unanticipated tech-
24 nical challenges affecting or related to the Ad-

1 ministration’s mission plans for the anticipated
2 use of advanced thermal conversion technology;

3 (3) assess the risk to the Administration’s pro-
4 grams of any potential delays in achieving the sched-
5 ule and milestones for planned domestic production
6 of radioisotope power system material;

7 (4) outline a process for meeting any additional
8 Administration requirements for the material;

9 (5) estimate the incremental costs required to
10 increase the amount of material produced each year,
11 if such an increase is needed to support additional
12 Administration requirements for the material;

13 (6) detail how the Administration and other
14 Federal agencies will manage, operate, and fund
15 production facilities and the design and development
16 of all radioisotope power systems used by the Ad-
17 ministration and other Federal agencies as nec-
18 essary;

19 (7) specify the steps the Administration will
20 take, in consultation with the Department of En-
21 ergy, to preserve the infrastructure and workforce
22 necessary for production of radioisotope power sys-
23 tems and ensure that its reimbursements to the De-
24 partment of Energy associated with such preserva-
25 tion are equitable and justified; and

1 (8) detail how the Administration has imple-
2 mented or rejected the recommendations from the
3 National Research Council’s 2009 report titled “Ra-
4 dioisotope Power Systems: An Imperative for Main-
5 taining U.S. Leadership in Space Exploration”.

6 (d) TRANSMITTAL.—Not later than 180 days after
7 the date of enactment of this Act, the Administrator shall
8 transmit the results of the analysis to the Committee on
9 Science, Space, and Technology of the House of Rep-
10 resentatives and the Committee on Commerce, Science,
11 and Transportation of the Senate.

12 **SEC. 303. CONGRESSIONAL DECLARATION OF POLICY AND**
13 **PURPOSE.**

14 Section 20102(d) of title 51, United States Code, is
15 amended by adding at the end the following new para-
16 graph:

17 “(10) The direction of the unique competence
18 of the Administration to the search for life’s origin,
19 evolution, distribution, and future in the Universe.
20 In carrying out this objective, the Administration
21 may use any practicable ground-based, airborne, or
22 space-based technical means and spectra of electro-
23 magnetic radiation.”.

1 **SEC. 304. UNIVERSITY CLASS SCIENCE MISSIONS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-
3 gress that principal investigator-led small orbital science
4 missions, including CubeSat class, University Explorer
5 (UNEX) class, Small Explorer (SMEX) class, and Ven-
6 ture class, offer valuable opportunities to advance science
7 at low cost, train the next generation of scientists and en-
8 gineers, and enable participants in the program to acquire
9 skills in systems engineering and systems integration that
10 are critical to maintaining the Nation’s leadership in space
11 and to enhancing the United States innovation and com-
12 petitiveness abroad.

13 (b) REVIEW OF PRINCIPAL INVESTIGATOR-LED
14 SMALL ORBITAL SCIENCE MISSIONS.—The Administrator
15 shall conduct a review of the science missions described
16 in subsection (a). The review shall include—

17 (1) the status, capability, and availability of ex-
18 isting small orbital science mission programs and
19 the extent to which each program enables the par-
20 ticipation of university scientists and students;

21 (2) the opportunities such mission programs
22 provide for scientific research;

23 (3) the opportunities such mission programs
24 provide for training and education, including sci-
25 entific and engineering workforce development, in-

1 including for the Administration’s scientific and engi-
2 neering workforce; and

3 (4) the extent to which commercial applications
4 such as hosted payloads, free flyers, and data buys
5 could provide measurable benefits for such mission
6 programs, while preserving the principle of inde-
7 pendent peer review as the basis for mission selec-
8 tion.

9 (c) REPORT.—Not later than 270 days after the date
10 of enactment of this Act, the Administrator shall transmit
11 to the Committee on Science, Space, and Technology of
12 the House of Representatives and the Committee on Com-
13 merce, Science, and Transportation of the Senate a report
14 on the review required under subsection (b) and on rec-
15 ommendations to enhance principal investigator-led small
16 orbital science missions conducted by the Administration
17 in accordance with the results of the review required by
18 subsection (b).

19 **SEC. 305. ASSESSMENT OF SCIENCE MISSION EXTENSIONS.**

20 Section 30504 of title 51, United States Code, is
21 amended to read as follows:

22 **“§ 30504. Assessment of science mission extensions**

23 “(a) ASSESSMENT.—The Administrator shall carry
24 out biennial reviews within each of the Science divisions
25 to assess the cost and benefits of extending the date of

1 the termination of data collection for those missions that
2 exceed their planned missions' lifetime. The assessment
3 shall take into consideration how extending missions im-
4 pacts the start of future missions.

5 “(b) CONSULTATION AND CONSIDERATION OF PO-
6 TENTIAL BENEFITS OF INSTRUMENTS ON MISSIONS.—
7 When deciding whether to extend a mission that has an
8 operational component, the Administrator shall consult
9 with any affected Federal agency and shall take into ac-
10 count the potential benefits of instruments on missions
11 that are beyond their planned mission lifetime.

12 “(c) REPORT.—The Administrator shall transmit to
13 the Committee on Science, Space, and Technology of the
14 House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate, at the
16 same time as the submission to Congress of the Adminis-
17 tration's annual budget request for each fiscal year, a re-
18 port detailing any assessment required by subsection (a)
19 that was carried out during the previous year.”.

20 **Subtitle B—Astrophysics**

21 **SEC. 311. DECADAL CADENCE.**

22 In carrying out section 301(b), the Administrator
23 shall seek to ensure to the extent practicable a steady ca-
24 dence of large, medium, and small astrophysics missions.

1 **SEC. 312. EXTRASOLAR PLANET EXPLORATION STRATEGY.**

2 (a) STRATEGY.—The Administrator shall enter into
3 an arrangement with the National Academies to develop
4 a science strategy for the study and exploration of
5 extrasolar planets, including the use of the Transiting
6 Exoplanet Survey Satellite, the James Webb Space Tele-
7 scope, a potential Wide-Field Infrared Survey Telescope
8 mission, or any other telescope, spacecraft, or instrument
9 as appropriate. Such strategy shall—

10 (1) outline key scientific questions;

11 (2) identify the most promising research in the
12 field;

13 (3) indicate the extent to which the mission pri-
14 orities in existing decadal surveys address the key
15 extrasolar planet research goals;

16 (4) identify opportunities for coordination with
17 international partners, commercial partners, and
18 other not-for-profit partners; and

19 (5) make recommendations on the above as ap-
20 propriate.

21 (b) USE OF STRATEGY.—The Administrator shall use
22 the strategy to—

23 (1) inform roadmaps, strategic plans, and other
24 activities of the Administration as they relate to
25 extrasolar planet research and exploration; and

1 (2) provide a foundation for future activities
2 and initiatives.

3 (c) REPORT TO CONGRESS.—Not later than 18
4 months after the date of enactment of this Act, the Na-
5 tional Academies shall transmit a report to the Adminis-
6 trator, and to the Committee on Science, Space, and Tech-
7 nology of the House of Representatives and the Committee
8 on Commerce, Science, and Transportation of the Senate,
9 containing the strategy developed under subsection (a).

10 **SEC. 313. JAMES WEBB SPACE TELESCOPE.**

11 It is the sense of Congress that—

12 (1) the James Webb Space Telescope will revo-
13 lutionize our understanding of star and planet for-
14 mation and how galaxies evolved, and advance the
15 search for the origins of the universe;

16 (2) the James Webb Space Telescope will en-
17 able American scientists to maintain their leadership
18 in astrophysics and other disciplines;

19 (3) the James Webb Space Telescope program
20 is making steady progress towards a launch in 2018;

21 (4) the on-time and on-budget delivery of the
22 James Webb Space Telescope is a high congressional
23 priority; and

24 (5) maintaining this progress will require the
25 Administrator to ensure that integrated testing is

1 appropriately timed and sufficiently comprehensive
2 to enable potential issues to be identified and ad-
3 dressed early enough to be handled within the James
4 Webb Space Telescope’s development schedule prior
5 to launch.

6 **SEC. 314. NATIONAL RECONNAISSANCE OFFICE TELESCOPE**
7 **DONATION.**

8 Not later than 90 days after the date of enactment
9 of this Act, the Administrator shall transmit a report to
10 the Committee on Science, Space, and Technology of the
11 House of Representatives and the Committee on Com-
12 merce, Science, and Transportation of the Senate out-
13 lining the cost of the Administration’s potential plan for
14 developing the Wide-Field Infrared Survey Telescope as
15 described in the 2010 National Academies’ astronomy and
16 astrophysics decadal survey, including an alternative plan
17 for the Wide-Field Infrared Survey Telescope 2.4, which
18 includes the donated 2.4-meter aperture National Recon-
19 naissance Office telescope. Due to the budget constraints
20 on the Administration’s science programs, this report shall
21 include—

22 (1) an assessment of cost efficient approaches
23 to develop the Wide-Field Infrared Survey Telescope;

1 (2) a comparison to the development of mission
2 concepts that exclude the utilization of the donated
3 asset;

4 (3) an assessment of how the Administration’s
5 existing science missions will be affected by the utili-
6 zation of the donated asset described in this section;
7 and

8 (4) a description of the cost associated with
9 storing and maintaining the donated asset.

10 **SEC. 315. WIDE-FIELD INFRARED SURVEY TELESCOPE.**

11 (a) SENSE OF CONGRESS.—It is the sense of Con-
12 gress that the Administrator, to the extent practicable,
13 should make progress on the technologies and capabilities
14 needed to position the Administration to meet the objec-
15 tives of the Wide-Field Infrared Survey Telescope mission,
16 as outlined in the 2010 National Academies’ astronomy
17 and astrophysics decadal survey, in a way that maximizes
18 the scientific productivity of meeting those objectives for
19 the resources invested. It is further the sense of Congress
20 that the Wide-Field Infrared Survey Telescope mission
21 has the potential to enable scientific discoveries that will
22 transform our understanding of the universe.

23 (b) CONTINUITY OF DEVELOPMENT.—The Adminis-
24 trator shall ensure that the concept definition and pre-
25 formulation activities of a Wide-Field Infrared Survey Tel-

1 escope mission continue while the James Webb Space Tel-
2 escope is being completed.

3 **SEC. 316. STRATOSPHERIC OBSERVATORY FOR INFRARED**
4 **ASTRONOMY.**

5 The Administrator shall not use any funding appro-
6 priated to the Administration for fiscal year 2016 for the
7 shutdown of the Stratospheric Observatory for Infrared
8 Astronomy or for the preparation therefor.

9 **Subtitle C—Planetary Science**

10 **SEC. 321. DECADAL CADENCE.**

11 In carrying out section 301(b), the Administrator
12 shall seek to ensure, to the greatest extent practicable,
13 that the Administration carries out a balanced set of plan-
14 etary science programs in accordance with the priorities
15 established in the most recent decadal survey for planetary
16 science. Such programs shall include, at a minimum—

17 (1) a Discovery-class mission at least once every
18 24 months;

19 (2) a New Frontiers-class mission at least once
20 every 60 months; and

21 (3) at least one Flagship-class mission per
22 decadal survey period, including a Europa mission
23 with a goal of launching by 2021.

1 **SEC. 322. NEAR-EARTH OBJECTS.**

2 (a) FINDINGS.—Congress makes the following find-
3 ings:

4 (1) Near-Earth objects pose a serious and cred-
5 ible threat to humankind, as many scientists believe
6 that a major asteroid or comet was responsible for
7 the mass extinction of the majority of the Earth’s
8 species, including the dinosaurs, approximately 65
9 million years ago.

10 (2) Similar objects have struck the Earth or
11 passed through the Earth’s atmosphere several times
12 in the Earth’s history and pose a similar threat in
13 the future.

14 (3) Several such near-Earth objects have only
15 been discovered within days of the objects’ closest
16 approach to Earth, and recent discoveries of such
17 large objects indicate that many large near-Earth
18 objects remain to be discovered.

19 (4) The efforts undertaken by the Administra-
20 tion for detecting and characterizing the hazards of
21 near-Earth objects should continue to seek to fully
22 determine the threat posed by such objects to cause
23 widespread destruction and loss of life.

24 (b) DEFINITION.—For purposes of this section, the
25 term “near-Earth object” means an asteroid or comet with

1 a perihelion distance of less than 1.3 Astronomical Units
2 from the Sun.

3 (c) NEAR-EARTH OBJECT SURVEY.—The Adminis-
4 trator shall continue to detect, track, catalogue, and char-
5 acterize the physical characteristics of near-Earth objects
6 equal to or greater than 140 meters in diameter in order
7 to assess the threat of such near-Earth objects to the
8 Earth, pursuant to the George E. Brown, Jr. Near-Earth
9 Object Survey Act (42 U.S.C. 16691). It shall be the goal
10 of the Survey program to achieve 90 percent completion
11 of its near-Earth object catalogue (based on statistically
12 predicted populations of near-Earth objects) by 2020.

13 (d) WARNING AND MITIGATION OF POTENTIAL HAZ-
14 ARDS OF NEAR-EARTH OBJECTS.—Congress reaffirms
15 the policy set forth in section 20102(g) of title 51, United
16 States Code (relating to detecting, tracking, cataloguing,
17 and characterizing asteroids and comets).

18 (e) PROGRAM REPORT.—The Director of the Office
19 of Science and Technology Policy and the Administrator
20 shall transmit to the Committee on Science, Space, and
21 Technology of the House of Representatives and the Com-
22 mittee on Commerce, Science, and Transportation of the
23 Senate, not later than 1 year after the date of enactment
24 of this Act, an initial report that provides—

1 (1) recommendations for carrying out the Sur-
2 vey program and an associated proposed budget;

3 (2) analysis of possible options that the Admin-
4 istration could employ to divert an object on a likely
5 collision course with Earth; and

6 (3) a description of the status of efforts to co-
7 ordinate and cooperate with other countries to dis-
8 cover hazardous asteroids and comets, plan a mitiga-
9 tion strategy, and implement that strategy in the
10 event of the discovery of an object on a likely colli-
11 sion course with Earth.

12 (f) ANNUAL REPORTS.—Subsequent to the initial re-
13 port the Administrator shall annually transmit to the
14 Committee on Science, Space, and Technology of the
15 House of Representatives and the Committee on Com-
16 merce, Science, and Transportation of the Senate a report
17 that provides—

18 (1) a summary of all activities carried out pur-
19 suant to subsection (c) since the date of enactment
20 of this Act, including the progress toward achieving
21 90 percent completion of the survey described in
22 subsection (c); and

23 (2) a summary of expenditures for all activities
24 carried out pursuant to subsection (c) since the date
25 of enactment of this Act.

1 (g) STUDY.—The Administrator, in collaboration
2 with other relevant Federal agencies, shall carry out a
3 technical and scientific assessment of the capabilities and
4 resources to—

5 (1) accelerate the survey described in subsection
6 (c); and

7 (2) expand the Administration’s Near-Earth
8 Object Program to include the detection, tracking,
9 cataloguing, and characterization of potentially haz-
10 ardous near-Earth objects less than 140 meters in
11 diameter.

12 (h) TRANSMITTAL.—Not later than 270 days after
13 the date of enactment of this Act, the Administrator shall
14 transmit the results of the assessment carried out under
15 subsection (g) to the Committee on Science, Space, and
16 Technology of the House of Representatives and the Com-
17 mittee on Commerce, Science, and Transportation of the
18 Senate.

19 **SEC. 323. NEAR-EARTH OBJECTS PUBLIC-PRIVATE PART-**
20 **NERSHIPS.**

21 (a) SENSE OF CONGRESS.—It is the sense of Con-
22 gress that the Administration should seek to leverage the
23 capabilities of the private sector and philanthropic organi-
24 zations to the maximum extent practicable in carrying out

1 the Near-Earth Object Survey program in order to meet
2 the goal of the Survey program.

3 (b) REPORT.—Not later than 180 days after the date
4 of enactment of this Act, the Administrator shall transmit
5 to the Committee on Science, Space, and Technology of
6 the House of Representatives and the Committee on Com-
7 merce, Science, and Transportation of the Senate a report
8 describing how the Administration can expand collabo-
9 rative partnerships to detect, track, catalogue, and cat-
10 egorize near-Earth objects.

11 **SEC. 324. RESEARCH ON NEAR-EARTH OBJECT TSUNAMI**
12 **EFFECTS.**

13 (a) REPORT ON POTENTIAL TSUNAMI EFFECTS
14 FROM NEAR-EARTH OBJECT IMPACT.—The Adminis-
15 trator, in collaboration with the Administrator of the Na-
16 tional Oceanic and Atmospheric Administration and other
17 relevant agencies, shall prepare a report identifying and
18 describing existing research activities and further research
19 objectives that would increase our understanding of the
20 nature of the effects of potential tsunamis that could occur
21 if a near-Earth object were to impact an ocean of Earth.

22 (b) TRANSMITTAL.—Not later than 180 days after
23 the date of enactment of this Act, the Administrator shall
24 transmit the report required and prepared under sub-
25 section (a) to the Committee on Science, Space, and Tech-

1 nology of the House of Representatives and the Committee
2 on Commerce, Science, and Transportation of the Senate.

3 **SEC. 325. ASTROBIOLOGY STRATEGY.**

4 (a) STRATEGY.—The Administrator shall enter into
5 an arrangement with the National Academies to develop
6 a science strategy for astrobiology that would outline key
7 scientific questions, identify the most promising research
8 in the field, and indicate the extent to which the mission
9 priorities in existing decadal surveys address the search
10 for life’s origin, evolution, distribution, and future in the
11 Universe. The strategy shall include recommendations for
12 coordination with international partners.

13 (b) USE OF STRATEGY.—The Administrator shall use
14 the strategy developed under subsection (a) in planning
15 and funding research and other activities and initiatives
16 in the field of astrobiology.

17 (c) REPORT TO CONGRESS.—Not later than 18
18 months after the date of enactment of this Act, the Na-
19 tional Academies shall transmit a report to the Adminis-
20 trator, and to the Committee on Science, Space, and Tech-
21 nology of the House of Representatives and the Committee
22 on Commerce, Science, and Transportation of the Senate,
23 containing the strategy developed under subsection (a).

1 **SEC. 326. ASTROBIOLOGY PUBLIC-PRIVATE PARTNERSHIPS.**

2 Not later than 180 days after the date of enactment
3 of this Act, the Administrator shall transmit to the Com-
4 mittee on Science, Space, and Technology of the House
5 of Representatives and the Committee on Commerce,
6 Science, and Transportation of the Senate a report de-
7 scribing how the Administration can expand collaborative
8 partnerships to study life's origin, evolution, distribution,
9 and future in the Universe.

10 **SEC. 327. ASSESSMENT OF MARS ARCHITECTURE.**

11 (a) ASSESSMENT.—The Administrator shall enter
12 into an arrangement with the National Academies to as-
13 sess—

14 (1) the Administration's revised post-2016
15 Mars exploration architecture and its responsiveness
16 to the strategies, priorities, and guidelines put for-
17 ward by the National Academies' planetary science
18 decadal surveys and other relevant National Acad-
19 emies Mars-related reports;

20 (2) the long-term goals of the Administration's
21 Mars Exploration Program and such program's abil-
22 ity to optimize the science return, given the current
23 fiscal posture of the program;

24 (3) the Mars architecture's relationship to
25 Mars-related activities to be undertaken by agencies
26 and organizations outside of the United States; and

1 (4) the extent to which the Mars architecture
2 represents a reasonably balanced mission portfolio.

3 (b) TRANSMITTAL.—Not later than 18 months after
4 the date of enactment of this Act, the Administrator shall
5 transmit the results of the assessment to the Committee
6 on Science, Space, and Technology of the House of Rep-
7 resentatives and the Committee on Commerce, Science,
8 and Transportation of the Senate.

9 **Subtitle D—Heliophysics**

10 **SEC. 331. DECADAL CADENCE.**

11 In carrying out section 301(b), the Administrator
12 shall seek to ensure to the extent practicable a steady ca-
13 dence of large, medium, and small heliophysics missions.

14 **SEC. 332. REVIEW OF SPACE WEATHER.**

15 (a) REVIEW.—The Director of the Office of Science
16 and Technology Policy, in consultation with the Adminis-
17 trator, the Administrator of the National Oceanic and At-
18 mospheric Administration, the Director of the National
19 Science Foundation, and heads of other relevant Federal
20 agencies, shall enter into an arrangement with the Na-
21 tional Academies to provide a comprehensive study that
22 reviews current and planned ground-based and space-
23 based space weather monitoring requirements and capa-
24 bilities, identifies gaps, and identifies options for a robust
25 and resilient capability. The study shall inform the process

1 of identifying national needs for future space weather
2 monitoring, forecasts, and mitigation. The National Acad-
3 emies shall give consideration to international and private
4 sector efforts and collaboration that could potentially con-
5 tribute to national space weather needs. The study shall
6 also review the current state of research capabilities in ob-
7 serving, modeling, and prediction and provide rec-
8 ommendations to ensure future advancement of predictive
9 capability.

10 (b) REPORT TO CONGRESS.—Not later than 14
11 months after the date of enactment of this Act, the Na-
12 tional Academies shall transmit a report containing the
13 results of the study provided under subsection (a) to the
14 Director of the Office of Science and Technology Policy,
15 and to the Committee on Science, Space, and Technology
16 of the House of Representatives and the Committee on
17 Commerce, Science, and Transportation of the Senate.

18 **Subtitle E—Earth Science**

19 **SEC. 341. GOAL.**

20 (a) SENSE OF CONGRESS.—It is the sense of Con-
21 gress that the Administration is being asked to undertake
22 important Earth science activities in an environment of
23 increasingly constrained fiscal resources, and that any
24 transfer of additional responsibilities to the Administra-
25 tion, such as climate instrument development and meas-

1 urements that are currently part of the portfolio of the
2 National Oceanic and Atmospheric Administration, should
3 be accompanied by the provision of additional resources
4 to allow the Administration to carry out the increased re-
5 sponsibilities without adversely impacting its implementa-
6 tion of its existing Earth science programs and priorities.

7 (b) GENERAL.—The Administrator shall continue to
8 carry out a balanced Earth science program that includes
9 Earth science research, Earth systematic missions, com-
10 petitive Venture class missions, other missions and data
11 analysis, mission operations, technology development, and
12 applied sciences, consistent with the recommendations and
13 priorities established in the National Academies’ Earth
14 Science Decadal Survey.

15 (c) COLLABORATION.—The Administrator shall col-
16 laborate with other Federal agencies, including the Na-
17 tional Oceanic and Atmospheric Administration, non-gov-
18 ernment entities, and international partners, as appro-
19 priate, in carrying out the Administration’s Earth science
20 program. The Administration shall continue to develop
21 first-of-a-kind instruments that, once proved, can be
22 transitioned to other agencies for operations.

23 (d) REIMBURSEMENT.—Whenever responsibilities for
24 the development of sensors or for measurements are trans-
25 ferred to the Administration from another agency, the Ad-

1 ministration shall seek, to the extent possible, to be reim-
2 bursed for the assumption of such responsibilities.

3 **SEC. 342. DECADAL CADENCE.**

4 In carrying out section 341(b), the Administrator
5 shall seek to ensure to the extent practicable a steady ca-
6 dence of large, medium, and small Earth science missions.

7 **SEC. 343. VENTURE CLASS MISSIONS.**

8 It is the sense of Congress that the Administration's
9 Venture class missions provide opportunities for innova-
10 tion in the Earth science program, offer low-cost ap-
11 proaches for high-quality competitive science investiga-
12 tions, enable frequent flight opportunities to engage the
13 Earth science and applications community, and serve as
14 a training ground for students and young scientists. It is
15 further the sense of Congress that the Administration
16 should seek to increase the number of Venture class
17 projects to the extent practicable as part of a balanced
18 Earth science program.

19 **SEC. 344. ASSESSMENT.**

20 The Administrator shall carry out a scientific assess-
21 ment of the Administration's Earth science global datasets
22 for the purpose of identifying those datasets that are use-
23 ful for understanding regional changes and variability, and
24 for informing applied science research. The Administrator
25 shall complete and transmit the assessment to the Com-

1 mittee on Science, Space, and Technology of the House
2 of Representatives and the Committee on Commerce,
3 Science, and Transportation of the Senate not later than
4 180 days after the date of enactment of this Act.

5 **TITLE IV—AERONAUTICS**

6 **SEC. 401. SENSE OF CONGRESS.**

7 It is the sense of Congress that—

8 (1) a robust aeronautics research portfolio will
9 help maintain the United States status as a leader
10 in aviation, enhance the competitiveness of the
11 United States in the world economy and improve the
12 quality of life of all citizens;

13 (2) aeronautics research is essential to the Ad-
14 ministration’s mission, continues to be an important
15 core element of the Administration’s mission and
16 should be supported;

17 (3) the Administrator should coordinate and
18 consult with relevant Federal agencies and the pri-
19 vate sector to minimize duplication and leverage re-
20 sources; and

21 (4) carrying aeronautics research to a level of
22 maturity that allows the Administration’s research
23 results to be transitioned to the users, whether pri-
24 vate or public sector, is critical to their eventual
25 adoption.

1 **SEC. 402. AERONAUTICS RESEARCH GOALS.**

2 The Administrator shall ensure that the Administra-
3 tion maintains a strong aeronautics research portfolio
4 ranging from fundamental research through integrated
5 systems research with specific research goals, including
6 the following:

7 (1) ENHANCE AIRSPACE OPERATIONS AND
8 SAFETY.—The Administration’s Aeronautics Re-
9 search Mission Directorate shall address research
10 needs of the Next Generation Air Transportation
11 System and identify critical gaps in technology
12 which must be bridged to enable the implementation
13 of the Next Generation Air Transportation System
14 so that safety and productivity improvements can be
15 achieved as soon as possible.

16 (2) IMPROVE AIR VEHICLE PERFORMANCE.—
17 The Administration’s Aeronautics Research Mission
18 Directorate shall conduct research to improve air-
19 craft performance and minimize environmental im-
20 pacts. The Associate Administrator for the Aero-
21 nautics Research Mission Directorate shall consider
22 and pursue concepts to reduce noise, emissions, and
23 fuel consumption while maintaining high safety
24 standards, and shall conduct research related to the
25 impact of alternative fuels on the safety, reliability
26 and maintainability of current and new air vehicles.

1 (3) STRENGTHEN AVIATION SAFETY.—The Ad-
2 ministration’s Aeronautics Research Mission Direc-
3 torate shall proactively address safety challenges as-
4 sociated with current and new air vehicles and with
5 operations in the Nation’s current and future air
6 transportation system.

7 (4) DEMONSTRATE CONCEPTS AT THE SYSTEM
8 LEVEL.—The Administration’s Aeronautics Research
9 Mission Directorate shall mature the most promising
10 technologies to the point at which they can be dem-
11 onstrated in a relevant environment and shall inte-
12 grate individual components and technologies as ap-
13 propriate to ensure that they perform in an inte-
14 grated manner as well as they do when operated in-
15 dividually.

16 **SEC. 403. UNMANNED AERIAL SYSTEMS RESEARCH AND DE-**
17 **VELOPMENT.**

18 (a) IN GENERAL.—The Administrator, in consulta-
19 tion with the Administrator of the Federal Aviation Ad-
20 ministration and other Federal agencies, shall carry out
21 research and technological development to facilitate the
22 safe integration of unmanned aerial systems into the Na-
23 tional Airspace System, including—

24 (1) positioning and navigation systems;

25 (2) sense and avoid capabilities;

- 1 (3) secure data and communication links;
- 2 (4) flight recovery systems; and
- 3 (5) human systems integration.

4 (b) ROADMAP.—The Administrator shall update a
5 roadmap for unmanned aerial systems research and devel-
6 opment and transmit this roadmap to the Committee on
7 Science, Space, and Technology of the House of Rep-
8 resentatives and the Committee on Commerce, Science,
9 and Transportation of the Senate not later than 180 days
10 after the date of enactment of this Act.

11 (c) COOPERATIVE UNMANNED AERIAL VEHICLE AC-
12 TIVITIES.—Section 31504 of title 51, United States Code,
13 is amended by inserting “Operational flight data derived
14 from these cooperative agreements shall be made available,
15 in appropriate and usable formats, to the Administration
16 and the Federal Aviation Administration for the develop-
17 ment of regulatory standards.” after “in remote areas.”.

18 **SEC. 404. RESEARCH PROGRAM ON COMPOSITE MATERIALS**

19 **USED IN AERONAUTICS.**

20 (a) PURPOSE OF RESEARCH.—The Administrator
21 shall continue the Administration’s cooperative research
22 program with industry to identify and demonstrate more
23 effective and safe ways of developing, manufacturing, and
24 maintaining composite materials for use in airframes, sub-
25 systems, and propulsion components.

1 (b) EXPOSURE OF RESEARCH TO NEXT GENERATION
2 OF ENGINEERS AND TECHNICIANS.—To the extent prac-
3 ticable, the Administration’s cooperative research program
4 with industry on composite materials shall provide timely
5 access to that research to the next generation of engineers
6 and technicians at universities, community colleges, and
7 vocational schools, thereby helping to develop a workforce
8 ready to take on the development, manufacture, and main-
9 tenance of components reliant on advanced composite ma-
10 terials.

11 (c) CONSULTATION.—The Administrator, in over-
12 seeing the Administration’s work on composite materials,
13 shall consult with relevant Federal agencies and partners
14 in industry to accelerate safe development and certifi-
15 cation processes for new composite materials and design
16 methods while maintaining rigorous inspection of new
17 composite materials.

18 (d) REPORT.—Not later than 1 year after the date
19 of enactment of this Act, the Administrator shall transmit
20 a report to the Committee on Science, Space, and Tech-
21 nology of the House of Representatives and the Committee
22 on Commerce, Science, and Transportation of the Senate
23 detailing the Administration’s work on new composite ma-
24 terials and the coordination efforts among Federal agen-
25 cies and industry partners.

1 **SEC. 405. HYPERSONIC RESEARCH.**

2 Not later than 1 year after the date of enactment
3 of this Act, the Administrator, in consultation with other
4 Federal agencies, shall develop and transmit to the Com-
5 mittee on Science, Space, and Technology of the House
6 of Representatives and the Committee on Commerce,
7 Science, and Transportation of the Senate a research and
8 development roadmap for hypersonic aircraft research
9 with the objective of exploring hypersonic science and
10 technology using air-breathing propulsion concepts,
11 through a mix of theoretical work, basic and applied re-
12 search, and development of flight research demonstration
13 vehicles. The roadmap shall prescribe appropriate agency
14 contributions, coordination efforts, and technology mile-
15 stones.

16 **SEC. 406. SUPERSONIC RESEARCH.**

17 (a) FINDINGS.—Congress finds that—

18 (1) the ability to fly commercial aircraft over
19 land at supersonic speeds without adverse impacts
20 on the environment or on local communities could
21 open new global markets and enable new transpor-
22 tation capabilities; and

23 (2) continuing the Administration’s research
24 program is necessary to assess the impact in a rel-
25 evant environment of commercial supersonic flight
26 operations and provide the basis for establishing ap-

1 appropriate sonic boom standards for such flight oper-
2 ations.

3 (b) ROADMAP FOR SUPERSONIC RESEARCH.—Not
4 later than 1 year after the date of enactment of this Act,
5 the Administrator shall develop and transmit to the Com-
6 mittee on Science, Space, and Technology of the House
7 of Representatives and the Committee on Commerce,
8 Science, and Transportation of the Senate a roadmap that
9 allows for flexible funding profiles for supersonic aero-
10 nautics research and development with the objective of de-
11 veloping and demonstrating, in a relevant environment,
12 airframe and propulsion technologies to minimize the envi-
13 ronmental impact, including noise, of supersonic overland
14 flight in an efficient and economical manner. The roadmap
15 shall include—

16 (1) the baseline research as embodied by the
17 Administration’s existing research on supersonic
18 flight;

19 (2) a list of specific technological, environ-
20 mental, and other challenges that must be overcome
21 to minimize the environmental impact, including
22 noise, of supersonic overland flight;

23 (3) a research plan to address such challenges,
24 as well as a project timeline for accomplishing rel-
25 evant research goals;

1 (4) a plan for coordination with stakeholders,
2 including relevant government agencies and indus-
3 try; and

4 (5) a plan for how the Administration will en-
5 sure that sonic boom research is coordinated as ap-
6 propriate with relevant Federal agencies.

7 **SEC. 407. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
8 **MENT CONCEPTS AND TOOLS.**

9 (a) IN GENERAL.—The Administrator shall, in con-
10 sultation with other Federal agencies, review at least an-
11 nually the alignment and timing of the Administration’s
12 research and development activities in support of the
13 NextGen airspace management modernization initiative,
14 and shall make any necessary adjustments by
15 reprioritizing or retargeting the Administration’s research
16 and development activities in support of the NextGen ini-
17 tiative.

18 (b) ANNUAL REPORTS.—The Administrator shall re-
19 port to the Committee on Science, Space, and Technology
20 of the House of Representatives and the Committee on
21 Commerce, Science, and Transportation of the Senate an-
22 nually regarding the progress of the Administration’s re-
23 search and development activities in support of the
24 NextGen airspace management modernization initiative,
25 including details of technologies transferred to relevant

1 Federal agencies for eventual operation implementation,
2 consultation with other Federal agencies, and any adjust-
3 ments made to research activities.

4 **SEC. 408. ROTORCRAFT RESEARCH.**

5 Not later than 1 year after the date of enactment
6 of this Act, the Administrator, in consultation with other
7 Federal agencies, shall prepare and transmit to the Com-
8 mittee on Science, Space, and Technology of the House
9 of Representatives and the Committee on Commerce,
10 Science, and Transportation of the Senate a roadmap for
11 research relating to rotorcraft and other runway-inde-
12 pendent air vehicles, with the objective of developing and
13 demonstrating improved safety, noise, and environmental
14 impact in a relevant environment. The roadmap shall in-
15 clude specific goals for the research, a timeline for imple-
16 mentation, metrics for success, and guidelines for collabo-
17 ration and coordination with industry and other Federal
18 agencies.

19 **SEC. 409. TRANSFORMATIVE AERONAUTICS RESEARCH.**

20 It is the sense of Congress that the Administrator,
21 in looking strategically into the future and ensuring that
22 the Administration's Center personnel are at the leading
23 edge of aeronautics research, should encourage investiga-
24 tions into the early-stage advancement of new processes,
25 novel concepts, and innovative technologies that have the

1 potential to meet national aeronautics needs. The Admin-
2 istrator shall continue to ensure that awards for the inves-
3 tigation of these concepts and technologies are open for
4 competition among Administration civil servants at its
5 Centers, separate from other awards open only to non-Ad-
6 ministration sources.

7 **SEC. 410. STUDY OF UNITED STATES LEADERSHIP IN AERO-**
8 **NAUTICS RESEARCH.**

9 (a) STUDY.—The Administrator shall enter into an
10 arrangement with the National Academies for a study to
11 benchmark the position of the United States in civil aero-
12 nautics research compared to the rest of the world. The
13 study shall—

14 (1) seek to define metrics by which relative
15 leadership in civil aeronautics research can be deter-
16 mined;

17 (2) ascertain how the United States compares
18 to other countries in the field of civil aeronautics re-
19 search and any relevant trends; and

20 (3) provide recommendations on what can be
21 done to regain or retain global leadership, includ-
22 ing—

23 (A) identifying research areas where
24 United States expertise has been or is at risk
25 of being overtaken;

1 (B) defining appropriate roles for the Ad-
2 ministration;

3 (C) identifying public-private partnerships
4 that could be formed; and

5 (D) estimating the impact on the Adminis-
6 tration's budget should such recommendations
7 be implemented.

8 (b) REPORT.—Not later than 18 months after the
9 date of enactment of this Act, the Administrator shall pro-
10 vide the results of the study to the Committee on Science,
11 Space, and Technology of the House of Representatives
12 and the Committee on Commerce, Science, and Transpor-
13 tation of the Senate.

14 **TITLE V—SPACE TECHNOLOGY**

15 **SEC. 501. SENSE OF CONGRESS.**

16 It is the sense of Congress that space technology is
17 critical to—

18 (1) enabling a new class of Administration mis-
19 sions beyond low-Earth orbit;

20 (2) developing technologies and capabilities that
21 will make the Administration's missions more afford-
22 able and more reliable; and

23 (3) improving technological capabilities and pro-
24 moting innovation for the Administration and the
25 Nation.

1 **SEC. 502. SPACE TECHNOLOGY PROGRAM.**

2 (a) AMENDMENT.—Section 70507 of title 51, United
3 States Code, is amended to read as follows:

4 **“§ 70507. Space Technology Program authorized**

5 “(a) PROGRAM AUTHORIZED.—The Administrator
6 shall establish a Space Technology Program to pursue the
7 research and development of advanced space technologies
8 that have the potential of delivering innovative solutions
9 and to support human exploration of the solar system or
10 advanced space science. The program established by the
11 Administrator shall take into consideration the rec-
12 ommendations of the National Academies’ review of the
13 Administration’s Space Technology roadmaps and prior-
14 ities, as well as applicable enabling aspects of the Human
15 Exploration Roadmap specified in section 70504. In con-
16 ducting the space technology program established under
17 this section, the Administrator shall—

18 “(1) to the maximum extent practicable, use a
19 competitive process to select projects to be supported
20 as part of the program;

21 “(2) make use of small satellites and the Ad-
22 ministration’s suborbital and ground-based plat-
23 forms, to the extent practicable and appropriate, to
24 demonstrate space technology concepts and develop-
25 ments; and

1 “(3) undertake partnerships with other Federal
2 agencies, universities, private industry, and other
3 spacefaring nations, as appropriate.

4 “(b) SMALL BUSINESS PROGRAMS.—The Adminis-
5 trator shall organize and manage the Administration’s
6 Small Business Innovation Research program and Small
7 Business Technology Transfer Program within the Space
8 Technology Program.

9 “(c) NONDUPLICATION CERTIFICATION.—The Ad-
10 ministrators shall include in the budget for each fiscal year,
11 as transmitted to Congress under section 1105(a) of title
12 31, a certification that no project, program, or mission
13 undertaken by the Space Technology Program is duplica-
14 tive of any other project, program, or mission conducted
15 by another office or directorate of the Administration.”.

16 (b) COLLABORATION, COORDINATION, AND ALIGN-
17 MENT.—The Administrator shall ensure that the Adminis-
18 tration’s projects, programs, and activities in support of
19 technology research and development of advanced space
20 technologies are fully coordinated and aligned and that re-
21 sults from such work are shared and leveraged within the
22 Administration. Projects, programs, and activities being
23 conducted by the Human Exploration and Operations Mis-
24 sion Directorate in support of research and development
25 of advanced space technologies and systems focusing on

1 human space exploration should continue in that Direc-
2 torate. The Administrator shall ensure that organizational
3 responsibility for research and development activities in
4 support of human space exploration not initiated as of the
5 date of enactment of this Act is established on the basis
6 of a sound rationale. The Administrator shall provide the
7 rationale in the report specified in subsection (d).

8 (c) REPORT.—Not later than 180 days after the date
9 of enactment of this Act, the Administrator shall provide
10 to the Committee on Science, Space, and Technology of
11 the House of Representatives and the Committee on Com-
12 merce, Science, and Transportation of the Senate a report
13 comparing the Administration’s space technology invest-
14 ments with the high-priority technology areas identified by
15 the National Academies in the National Research Coun-
16 cil’s report on the Administration’s Space Technology
17 Roadmaps. The Administrator shall identify how the Ad-
18 ministration will address any gaps between the agency’s
19 investments and the recommended technology areas, in-
20 cluding a projection of funding requirements.

21 (d) ANNUAL REPORT.—The Administrator shall in-
22 clude in the Administration’s annual budget request for
23 each fiscal year the rationale for assigning organizational
24 responsibility for, in the year prior to the budget fiscal
25 year, each initiated project, program, and mission focused

1 on research and development of advanced technologies for
2 human space exploration.

3 (e) TABLE OF SECTIONS AMENDMENT.—The item
4 relating to section 70507 in the table of sections for chap-
5 ter 705 of title 51, United States Code, is amended to
6 read as follows:

“70507. Space Technology Program authorized.”.

7 **SEC. 503. UTILIZATION OF THE INTERNATIONAL SPACE**
8 **STATION FOR TECHNOLOGY DEMONSTRA-**
9 **TIONS.**

10 The Administrator shall utilize the International
11 Space Station and commercial services for space tech-
12 nology demonstration missions in low-Earth orbit when-
13 ever it is practical and cost effective to do so.

14 **TITLE VI—EDUCATION**

15 **SEC. 601. EDUCATION.**

16 (a) SENSE OF CONGRESS.—It is the sense of Con-
17 gress that—

18 (1) the Administration’s missions are an inspi-
19 ration for Americans and in particular for the next
20 generation, and that this inspiration has a powerful
21 effect in stimulating interest in science, technology,
22 engineering, and mathematics (in this section re-
23 ferred to as “STEM”) education and careers;

24 (2) the Administration’s Office of Education
25 and mission directorates have been effective in deliv-

1 ering Administration educational content because of
2 the strong engagement of Administration scientists
3 and engineers in the Administration’s education and
4 outreach activities; and

5 (3) the Administration should be a central part-
6 ner in contributing to the goals of the National
7 Science and Technology Council’s Federal Science,
8 Technology, Engineering, and Mathematics (STEM)
9 Education 5-Year Strategic Plan.

10 (b) IN GENERAL.—The Administration shall continue
11 its education and outreach efforts to—

12 (1) increase student interest and participation
13 in STEM education;

14 (2) improve public literacy in STEM;

15 (3) employ proven strategies for improving stu-
16 dent learning and teaching;

17 (4) provide curriculum support materials; and

18 (5) create and support opportunities for profes-
19 sional development for STEM teachers.

20 (c) ORGANIZATION.—In order to ensure the inspira-
21 tion and engagement of children and the general public,
22 the Administration shall continue its STEM education and
23 outreach activities within the Science, Aeronautics Re-
24 search, Space Operations, and Exploration Mission Direc-
25 torates.

1 (d) CONTINUATION OF EDUCATION AND OUTREACH
2 ACTIVITIES AND PROGRAMS.—The Administrator shall
3 continue to carry out education and outreach programs
4 and activities through the Office of Education and the Ad-
5 ministration mission directorates and shall continue to en-
6 gage, to the maximum extent practicable, Administration
7 and Administration-supported researchers and engineers
8 in carrying out those programs and activities.

9 (e) CONTINUATION OF SPACE GRANT PROGRAM.—
10 The Administrator shall continue to operate the National
11 Space Grant College and Fellowship program through a
12 national network consisting of a State-based consortium
13 in each State that provides flexibility to the States, with
14 the objective of providing hands-on research, training, and
15 education programs, with measurable outcomes, to en-
16 hance America’s STEM education and workforce.

17 (f) REAFFIRMATION OF POLICY.—Congress reaffirms
18 its commitment to informal science education at science
19 centers and planetariums as set forth in section 616 of
20 the National Aeronautics and Space Administration Au-
21 thorization Act of 2005 (51 U.S.C. 40907).

1 **SEC. 602. INDEPENDENT REVIEW OF THE NATIONAL SPACE**
2 **GRANT COLLEGE AND FELLOWSHIP PRO-**
3 **GRAM.**

4 (a) SENSE OF CONGRESS.—It is the sense of Con-
5 gress that the National Space Grant College and Fellow-
6 ship Program, which was established in the National Aero-
7 nautics and Space Administration Authorization Act of
8 1988 (42 U.S.C. 2486 et seq.), has been an important
9 program by which the Federal Government has partnered
10 with State and local governments, universities, private in-
11 dustry, and other organizations to enhance the under-
12 standing and use of space and aeronautics activities and
13 their benefits through education, fostering of interdiscipli-
14 nary and multidisciplinary space research and training,
15 and supporting Federal funding for graduate fellowships
16 in space-related fields, among other purposes.

17 (b) REVIEW.—The Administrator shall enter into an
18 arrangement with the National Academies for—

19 (1) a review of the National Space Grant Col-
20 lege and Fellowship Program, including its structure
21 and capabilities for supporting science, technology,
22 engineering, and mathematics education and train-
23 ing consistent with the National Science and Tech-
24 nology Council’s Federal Science, Technology, Engi-
25 neering, and Mathematics (STEM) Education 5-
26 Year Strategic Plan; and

1 (2) recommendations on measures, if needed, to
2 enhance the Program’s effectiveness and mecha-
3 nisms by which any increases in funding appro-
4 priated by Congress can be applied.

5 (c) NATIONAL SPACE GRANT COLLEGE AND FEL-
6 LOWSHIP PROGRAM AMENDMENTS.—

7 (1) PURPOSES.—Section 40301 of title 51,
8 United States Code, is amended—

9 (A) by striking “and” at the end of para-
10 graph (5);

11 (B) by striking the period at the end of
12 paragraph (6) and inserting “; and”; and

13 (C) by adding at the end the following new
14 paragraph:

15 “(7) support outreach to primary and sec-
16 ondary schools to help support STEM engagement
17 and learning at the K–12 level and to encourage K–
18 12 students to pursue postsecondary degrees in
19 fields related to space.”.

20 (2) REGIONAL CONSORTIUM.—Section 40306 of
21 title 51, United States Code, is amended—

22 (A) in subsection (a)—

23 (i) by redesignating paragraphs (2)
24 and (3) as paragraphs (3) and (4), respec-
25 tively; and

1 (ii) by inserting after paragraph (1)
2 the following new paragraph:

3 “(2) INCLUSION OF 2-YEAR INSTITUTIONS.—A
4 space grant regional consortium designated in para-
5 graph (1)(B) may include one or more 2-year insti-
6 tutions of higher education.”; and

7 (B) in subsection (b)(1), by striking “para-
8 graphs (2)(C) and (3)(D)” and inserting “para-
9 graphs (3)(C) and (4)(D)”.

10 **SEC. 603. SENSE OF CONGRESS.**

11 It is the sense of Congress that the Administrator
12 should make the continuation of the Administration’s Mi-
13 nority University Research and Education Program a pri-
14 ority in order to further STEM education for underrep-
15 resented students.

16 **TITLE VII—POLICY PROVISIONS**

17 **SEC. 701. ASTEROID RETRIEVAL MISSION.**

18 (a) ASTEROID RETRIEVAL REPORT.—Not later than
19 180 days after the date of enactment of this Act, the Ad-
20 ministrator shall provide to the Committee on Science,
21 Space, and Technology of the House of Representatives
22 and the Committee on Commerce, Science, and Transpor-
23 tation of the Senate a report on the proposed Asteroid
24 Retrieval Mission. Such report shall include—

1 (1) a detailed budget profile, including cost esti-
2 mates for the development of all necessary tech-
3 nologies and spacecraft required for the mission;

4 (2) a detailed technical plan that includes mile-
5 stones and a specific schedule;

6 (3) a description of the technologies and capa-
7 bilities anticipated to be gained from the proposed
8 mission that will enable future human missions to
9 Mars which could not be gained by lunar missions;

10 (4) a description of the technologies and capa-
11 bilities anticipated to be gained from the proposed
12 mission that will enable future planetary defense
13 missions, against impact threats from near-Earth
14 objects equal to or greater than 140 meters in di-
15 ameter, which could not be gained by robotic mis-
16 sions; and

17 (5) a complete assessment by the Small Bodies
18 Assessment Group and the National Aeronautics and
19 Space Administration Advisory Council of how the
20 proposed mission is or is not in the strategic inter-
21 ests of the United States in space exploration.

22 (b) MARS FLYBY REPORT.—Not later than 60 days
23 after the date of enactment of this Act, an independent,
24 private systems engineering and technical assistance orga-
25 nization contracted by the Human Exploration Operations

1 Mission Directorate shall transmit to the Administrator,
2 the Committee on Science, Space, and Technology of the
3 House of Representatives, and the Committee on Com-
4 merce, Science, and Transportation of the Senate a report
5 analyzing the proposal for a Mars Flyby human
6 spaceflight mission to be launched in 2021. Such report
7 shall include—

8 (1) a technical development, test, fielding, and
9 operations plan using the Space Launch System and
10 other systems to successfully mount a Mars Flyby
11 mission by 2021;

12 (2) a description of the benefits in scientific
13 knowledge and technologies demonstrated by a Mars
14 Flyby mission to be launched in 2021 suitable for
15 future Mars missions; and

16 (3) an annual budget profile, including cost es-
17 timates, for the development test, fielding, and oper-
18 ations plan to carry out a Mars Flyby mission
19 through 2021 and comparison of that budget profile
20 to the 5-year budget profile contained in the Presi-
21 dent’s Budget request for fiscal year 2017.

22 (c) ASSESSMENT.—Not later than 60 days after
23 transmittal of the report specified in subsection (b), the
24 Administrator shall transmit to the Committee on Science,
25 Space, and Technology of the House of Representatives

1 and the Committee on Commerce, Science, and Transpor-
2 tation of the Senate an assessment by the National Aero-
3 nautics and Space Administration Advisory Council of
4 whether the proposal for a Mars Flyby Mission to be
5 launched in 2021 is in the strategic interests of the United
6 States in space exploration.

7 (d) CREWED MISSION.—The report transmitted
8 under subsection (b) may consider a crewed mission with
9 the Space Launch System in cis-lunar space prior to the
10 Mars Flyby mission in 2021.

11 **SEC. 702. TERMINATION LIABILITY SENSE OF CONGRESS.**

12 It is the sense of Congress that:

13 (1) The International Space Station, the Space
14 Launch System, and the Orion crew vehicle will en-
15 able the Nation to continue operations in low-Earth
16 orbit and to send its astronauts to deep space. The
17 James Webb Space Telescope will revolutionize our
18 understanding of star and planet formation and how
19 galaxies evolved and advance the search for the ori-
20 gins of our universe. As a result of their unique ca-
21 pabilities and their critical contribution to the future
22 of space exploration, these systems have been des-
23 ignated by Congress and the Administration as pri-
24 ority investments.

1 (2) In addition, contractors are currently hold-
2 ing program funding, estimated to be in the hun-
3 dreds of millions of dollars, to cover the potential
4 termination liability should the Government choose
5 to terminate a program for convenience. As a result,
6 hundreds of millions of taxpayer dollars are unavail-
7 able for meaningful work on these programs.

8 (3) According to the Government Accountability
9 Office, the Administration procures most of its
10 goods and services through contracts, and it termi-
11 nates very few of them. In fiscal year 2010, the Ad-
12 ministration terminated 28 of 16,343 active con-
13 tracts and orders—a termination rate of about 0.17
14 percent.

15 (4) The Administration should vigorously pur-
16 sue a policy on termination liability that maximizes
17 the utilization of its appropriated funds to make
18 maximum progress in meeting established technical
19 goals and schedule milestones on these high-priority
20 programs.

21 **SEC. 703. BASELINE AND COST CONTROLS.**

22 Section 30104 of title 51, United States Code, is
23 amended—

24 (1) in subsection (a)(1), by striking “Proce-
25 dural Requirements 7120.5c, dated March 22,

1 2005” and inserting “Procedural Requirements
2 7120.5E, dated August 14, 2012”; and

3 (2) in subsection (f), by striking “beginning 18
4 months after the date the Administrator transmits a
5 report under subsection (e)(1)(A)” and inserting
6 “beginning 18 months after the Administrator
7 makes such determination”.

8 **SEC. 704. PROJECT AND PROGRAM RESERVES.**

9 (a) SENSE OF CONGRESS.—It is the sense of Con-
10 gress that the judicious use of program and project re-
11 serves provides the Administration’s project and program
12 managers with the flexibility needed to manage projects
13 and programs to ensure that the impacts of contingencies
14 can be mitigated.

15 (b) REPORT.—Not later than 180 days after the date
16 of enactment of this Act the Administrator shall transmit
17 to the Committee on Science, Space, and Technology of
18 the House of Representatives and the Committee on Com-
19 merce, Science, and Transportation of the Senate a report
20 describing—

21 (1) the Administration’s criteria for establishing
22 the amount of reserves held at the project and pro-
23 gram levels;

1 (2) how such criteria relate to the agency’s poli-
2 icy of budgeting at a 70-percent confidence level;
3 and

4 (3) the Administration’s criteria for waiving the
5 policy of budgeting at a 70-percent confidence level
6 and alternative strategies and mechanisms aimed at
7 controlling program and project costs when a waiver
8 is granted.

9 **SEC. 705. INDEPENDENT REVIEWS.**

10 Not later than 270 days after the date of enactment
11 of this Act, the Administrator shall transmit to the Com-
12 mittee on Science, Space, and Technology of the House
13 of Representatives and the Committee on Commerce,
14 Science, and Transportation of the Senate a report de-
15 scribing—

16 (1) the Administration’s procedures for con-
17 ducting independent reviews of projects and pro-
18 grams at lifecycle milestones and how the Adminis-
19 tration ensures the independence of the individuals
20 who conduct those reviews prior to their assignment;

21 (2) the internal and external entities inde-
22 pendent of project and program management that
23 conduct reviews of projects and programs at life
24 cycle milestones; and

1 (3) how the Administration ensures the inde-
2 pendence of such entities and their members.

3 **SEC. 706. COMMERCIAL TECHNOLOGY TRANSFER PRO-**
4 **GRAM.**

5 Section 50116(a) of title 51, United States Code, is
6 amended by inserting “, while protecting national secu-
7 rity” after “research community”.

8 **SEC. 707. NATIONAL AERONAUTICS AND SPACE ADMINIS-**
9 **TRATION ADVISORY COUNCIL.**

10 (a) STUDY.—The Administrator shall enter into an
11 arrangement with the National Academy of Public Admin-
12 istration to assess the effectiveness of the NASA Advisory
13 Council and to make recommendations to Congress for
14 any change to—

15 (1) the functions of the Council;

16 (2) the appointment of members to the Council;

17 (3) qualifications for members of the Council;

18 (4) duration of terms of office for members of
19 the Council;

20 (5) frequency of meetings of the Council;

21 (6) the structure of leadership and Committees
22 of the Council; and

23 (7) levels of professional staffing for the Coun-
24 cil.

1 In carrying out the assessment, the Academy shall also
2 assess the impacts of broadening the Council’s role to ad-
3 vising Congress, and any other issues that the Academy
4 determines could potentially impact the effectiveness of
5 the Council. The Academy shall consider the past activities
6 of the NASA Advisory Council, as well as the activities
7 of other analogous Federal advisory bodies in conducting
8 its assessment. The results of the assessment, including
9 any recommendations, shall be transmitted to the Com-
10 mittee on Science, Space, and Technology of the House
11 of Representatives and the Committee on Commerce,
12 Science, and Transportation of the Senate.

13 (b) CONSULTATION AND ADVICE.—Section 20113(g)
14 of title 51, United States Code, is amended by inserting
15 “and Congress” after “advice to the Administration”.

16 (c) SUNSET.—Effective on September 30, 2016, sec-
17 tion 20113(g) of title 51, United States Code, is amended
18 by striking “and Congress”.

19 **SEC. 708. COST ESTIMATION.**

20 (a) SENSE OF CONGRESS.—It is the sense of Con-
21 gress that realistic cost estimating is critically important
22 to the ultimate success of major space development
23 projects. The Administration has devoted significant ef-
24 forts over the past 5 years to improving its cost estimating
25 capabilities, but it is important that the Administration

1 continue its efforts to develop and implement guidance in
2 establishing realistic cost estimates.

3 (b) GUIDANCE AND CRITERIA.—The Administrator
4 shall provide to programs and projects, and in a manner
5 consistent with the Administration’s Space Flight Pro-
6 gram and Project Management Requirements—

7 (1) guidance on when an Independent Cost Es-
8 timate and Independent Cost Assessment should be
9 used; and

10 (2) the criteria to be used to make such a de-
11 termination.

12 (c) REPORT.—Not later than 270 days after the date
13 of enactment of this Act, the Administrator shall transmit
14 to the Committee on Science, Space, and Technology of
15 the House of Representatives and the Committee on Com-
16 merce, Science, and Transportation of the Senate a re-
17 port—

18 (1) describing efforts to enhance internal cost
19 estimation and assessment expertise;

20 (2) describing the mechanisms the Administra-
21 tion is using and will continue to use to ensure that
22 adequate resources are dedicated to cost estimation;

23 (3) listing the steps the Administration is un-
24 dertaking to advance consistent implementation of
25 the joint cost and schedule process;

1 (4) identifying criteria used by programs and
2 projects in determining when to conduct an Inde-
3 pendent Cost Estimate and Independent Cost As-
4 sessment; and

5 (5) listing—

6 (A) the costs of each individual Inde-
7 pendent Cost Estimate or Independent Cost As-
8 sessment activity conducted in fiscal year 2012,
9 fiscal year 2013, fiscal year 2014, and fiscal
10 year 2015;

11 (B) the purpose of the activity;

12 (C) identification of the primary Adminis-
13 tration unit or outside body that conducted the
14 activity; and

15 (D) key findings and recommendations.

16 (d) UPDATED REPORT.—Subsequent to submission
17 of the report under subsection (c), for each subsequent
18 year, the Administrator shall provide an update of listed
19 elements in conjunction with subsequent congressional
20 budget justifications.

21 **SEC. 709. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
22 **TEREST IN MAJOR ADMINISTRATION ACQUI-**
23 **SITION PROGRAMS.**

24 (a) REVISED REGULATIONS REQUIRED.—Not later
25 than 270 days after the date of enactment of this Act,

1 the Administrator shall revise the Administration Supple-
2 ment to the Federal Acquisition Regulation to provide uni-
3 form guidance and recommend revised requirements for
4 organizational conflicts of interest by contractors in major
5 acquisition programs in order to address elements identi-
6 fied in subsection (b).

7 (b) ELEMENTS.—The revised regulations required by
8 subsection (a) shall, at a minimum—

9 (1) address organizational conflicts of interest
10 that could potentially arise as a result of—

11 (A) lead system integrator contracts on
12 major acquisition programs and contracts that
13 follow lead system integrator contracts on such
14 programs, particularly contracts for production;

15 (B) the ownership of business units per-
16 forming systems engineering and technical as-
17 sistance functions, professional services, or
18 management support services in relation to
19 major acquisition programs by contractors who
20 simultaneously own business units competing to
21 perform as either the prime contractor or the
22 supplier of a major subsystem or component for
23 such programs;

24 (C) the award of major subsystem con-
25 tracts by a prime contractor for a major acqui-

1 sition program to business units or other affili-
2 ates of the same parent corporate entity, and
3 particularly the award of subcontracts for soft-
4 ware integration or the development of a pro-
5 prietary software system architecture; or

6 (D) the performance by, or assistance of,
7 contractors in technical evaluations on major
8 acquisition programs;

9 (2) ensure that the Administration receives ad-
10 vice on systems architecture and systems engineer-
11 ing matters with respect to major acquisition pro-
12 grams from objective sources independent of the
13 prime contractor;

14 (3) require that a contract for the performance
15 of systems engineering and technical assistance
16 functions for a major acquisition program contains
17 a provision prohibiting the contractor or any affiliate
18 of the contractor from participating as a prime con-
19 tractor or a major subcontractor in the development
20 of a system under the program; and

21 (4) establish such limited exceptions to the re-
22 quirement in paragraphs (2) and (3) as may be nec-
23 essary to ensure that the Administration has contin-
24 ued access to advice on systems architecture and
25 systems engineering matters from highly qualified

1 contractors with domain experience and expertise,
2 while ensuring that such advice comes from sources
3 that are objective and unbiased.

4 **SEC. 710. FACILITIES AND INFRASTRUCTURE.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that—

7 (1) the Administration must reverse the deterio-
8 rating condition of its facilities and infrastructure,
9 as this condition is hampering the effectiveness and
10 efficiency of research performed by both the Admin-
11 istration and industry participants making use of
12 Administration facilities, thus reducing the competi-
13 tiveness of the United States aerospace industry;

14 (2) the Administration has a role in providing
15 laboratory capabilities that are not available else-
16 where to industry participants that are economically
17 viable as commercial entities;

18 (3) to ensure continued access to reliable and
19 efficient world-class facilities by researchers, the Ad-
20 ministration should seek to establish strategic part-
21 nerships with other Federal agencies, academic insti-
22 tutions, and industry, as appropriate; and

23 (4) decisions on whether to dispose of, main-
24 tain, or modernize existing facilities must be made
25 in the context of meeting future Administration and

1 other Federal agencies' laboratory needs, including
2 those required to meet the activities supporting the
3 Human Exploration Roadmap required by section
4 70504 of title 51, United States Code, as added by
5 section 202 of this Act.

6 (b) POLICY.—It is the policy of the United States
7 that the Administration maintain reliable and efficient fa-
8 cilities and that decisions on whether to dispose of, main-
9 tain, or modernize existing facilities be made in the con-
10 text of meeting future Administration needs.

11 (c) PLAN.—The Administrator shall develop a plan
12 that has the goal of positioning the Administration to have
13 the facilities, laboratories, tools, and approaches necessary
14 to address future Administration requirements. Such plan
15 shall identify—

16 (1) future Administration research and develop-
17 ment and testing needs;

18 (2) a strategy for identifying facilities that are
19 candidates for disposal, that is consistent with the
20 national strategic direction set forth in—

21 (A) the National Space Policy;

22 (B) the National Aeronautics Research,
23 Development, Test, and Evaluation Infrastruc-
24 ture Plan;

1 (C) National Aeronautics and Space Ad-
2 ministration Authorization Acts; and

3 (D) the Human Exploration Roadmap
4 specified in section 70504 of title 51, United
5 States Code, as added by section 202 of this
6 Act;

7 (3) a strategy for the maintenance, repair, up-
8 grading, and modernization of the Administration's
9 laboratories, facilities, and equipment;

10 (4) criteria for prioritizing deferred mainte-
11 nance tasks and also for upgrading or modernizing
12 laboratories, facilities, and equipment and imple-
13 menting processes, plans, and policies for guiding
14 the Administration's Centers on whether to main-
15 tain, repair, upgrade, or modernize a facility and for
16 determining the type of instrument to be used;

17 (5) an assessment of modifications needed to
18 maximize usage of facilities that offer unique and
19 highly specialized benefits to the aerospace industry
20 and the American public;

21 (6) barriers, if any, to the application of exist-
22 ing Working Capital Fund authorities that would
23 enable to the maximum extent practicable that all fi-
24 nancial savings achieved by closing outdated or sur-
25 plus facilities at an Administration Center be made

1 available to that Center for the purpose of modern-
2 izing the Center’s facilities and laboratories and for
3 upgrading the infrastructure at the Center; and

4 (7) implementation steps, including a timeline,
5 milestones, and an estimate of resources, required
6 for carrying out the plan.

7 (d) POLICY.—Not later than 180 days after the date
8 of enactment of this Act, the Administrator shall establish
9 and make publically available a policy that guides the Ad-
10 ministration’s use of existing authorities to out-grant,
11 lease, excess to the General Services Administration, sell,
12 decommission, demolish, or otherwise transfer property,
13 facilities, or infrastructure. This policy shall establish cri-
14 teria for the use of authorities, best practices, standard-
15 ized procedures, and guidelines for how to appropriately
16 manage property, infrastructure, and facilities.

17 (e) TRANSMITTAL.—Not later than one year after the
18 date of enactment of this Act, the Administrator shall
19 transmit the plan developed under subsection (c) to the
20 Committee on Science, Space, and Technology of the
21 House of Representatives and the Committee on Com-
22 merce, Science, and Transportation of the Senate.

23 **SEC. 711. DETECTION AND AVOIDANCE OF COUNTERFEIT**
24 **ELECTRONIC PARTS.**

25 (a) REGULATIONS.—

1 (1) IN GENERAL.—Not later than 270 days
2 after the date of enactment of this Act, the Adminis-
3 trator shall revise the National Aeronautics and
4 Space Administration Supplement to the Federal
5 Acquisition Regulation to address the detection and
6 avoidance of counterfeit electronic parts.

7 (2) CONTRACTOR RESPONSIBILITIES.—The re-
8 vised regulations issued pursuant to paragraph (1)
9 shall provide that—

10 (A) Administration contractors who supply
11 electronic parts or products that include elec-
12 tronic parts are responsible for detecting and
13 avoiding the use or inclusion of counterfeit elec-
14 tronic parts or suspect counterfeit electronic
15 parts in such products and for any rework or
16 corrective action that may be required to rem-
17 edy the use or inclusion of such parts; and

18 (B) the cost of counterfeit electronic parts
19 and suspect counterfeit electronic parts and the
20 cost of rework or corrective action that may be
21 required to remedy the use or inclusion of such
22 parts are not allowable costs under Administra-
23 tion contracts, unless—

24 (i) the covered contractor has an oper-
25 ational system to detect and avoid counter-

1 feit parts and suspect counterfeit electronic
2 parts that has been reviewed and approved
3 by the Administration or the Department
4 of Defense;

5 (ii) the covered contractor provides
6 timely notice to the Administration pursu-
7 ant to paragraph (4); or

8 (iii) the counterfeit electronic parts or
9 suspect counterfeit electronic parts were
10 provided to the contractor as Government
11 property in accordance with part 45 of the
12 Federal Acquisition Regulation.

13 (3) SUPPLIERS OF ELECTRONIC PARTS.—The
14 revised regulations issued pursuant to paragraph (1)
15 shall—

16 (A) require that the Administration and
17 Administration contractors and subcontractors
18 at all tiers—

19 (i) obtain electronic parts that are in
20 production or currently available in stock
21 from the original manufacturers of the
22 parts or their authorized dealers, or from
23 suppliers who obtain such parts exclusively
24 from the original manufacturers of the
25 parts or their authorized dealers; and

1 (ii) obtain electronic parts that are
2 not in production or currently available in
3 stock from suppliers that meet qualifica-
4 tion requirements established pursuant to
5 subparagraph (C);

6 (B) establish documented requirements
7 consistent with published industry standards or
8 Government contract requirements for—

9 (i) notification of the Administration;
10 and

11 (ii) inspection, testing, and authen-
12 tication of electronic parts that the Admin-
13 istration or an Administration contractor
14 or subcontractor obtains from any source
15 other than a source described in subpara-
16 graph (A);

17 (C) establish qualification requirements,
18 consistent with the requirements of section
19 2319 of title 10, United States Code, pursuant
20 to which the Administration may identify sup-
21 pliers that have appropriate policies and proce-
22 dures in place to detect and avoid counterfeit
23 electronic parts and suspect counterfeit elec-
24 tronic parts; and

1 (D) authorize Administration contractors
2 and subcontractors to identify and use addi-
3 tional suppliers beyond those identified pursu-
4 ant to subparagraph (C) provided that—

5 (i) the standards and processes for
6 identifying such suppliers comply with es-
7 tablished industry standards;

8 (ii) the contractor or subcontractor
9 assumes responsibility for the authenticity
10 of parts provided by such suppliers as pro-
11 vided in paragraph (2); and

12 (iii) the selection of such suppliers is
13 subject to review and audit by appropriate
14 Administration officials.

15 (4) TIMELY NOTIFICATION.—The revised regu-
16 lations issued pursuant to paragraph (1) shall re-
17 quire that any Administration contractor or subcon-
18 tractor who becomes aware, or has reason to sus-
19 spect, that any end item, component, part, or mate-
20 rial contained in supplies purchased by the Adminis-
21 tration, or purchased by a contractor or subcon-
22 tractor for delivery to, or on behalf of, the Adminis-
23 tration, contains counterfeit electronic parts or sus-
24 spect counterfeit electronic parts, shall provide notifi-

1 cation to the applicable Administration contracting
2 officer within 30 calendar days.

3 (b) REPORT.—Not later than 120 days after the re-
4 vised regulations specified in subsection (a) have been im-
5 plemented, the Administrator shall submit to the Com-
6 mittee on Science, Space, and Technology of the House
7 of Representatives and the Committee on Commerce,
8 Science, and Transportation of the Senate a report updat-
9 ing the Administration’s actions to prevent counterfeit
10 electronic parts from entering the supply chain as de-
11 scribed in its October 2011 report pursuant to section
12 1206(d) of the National Aeronautics and Space Adminis-
13 tration Authorization Act of 2010 (42 U.S.C. 18444(d)).

14 (c) DEFINITION.—In this section, the term “elec-
15 tronic part” means a discrete electronic component, in-
16 cluding a microcircuit, transistor, capacitor, resistor, or
17 diode that is intended for use in a safety or mission critical
18 application.

19 **SEC. 712. SPACE ACT AGREEMENTS.**

20 (a) COST SHARING.—To the extent that the Adminis-
21 trator determines practicable, the funds provided by the
22 Government under a funded Space Act Agreement shall
23 not exceed the total amount provided by other parties to
24 the Space Act Agreement.

1 (b) NEED.—A funded Space Act Agreement may be
2 used only when the use of a standard contract, grant, or
3 cooperative agreement is not feasible or appropriate, as
4 determined by the Associate Administrator for Procure-
5 ment.

6 (c) PUBLIC NOTICE AND COMMENT.—The Adminis-
7 trator shall make available for public notice and comment
8 each proposed Space Act Agreement at least 30 days be-
9 fore entering into such agreement, with appropriate
10 redactions for proprietary, sensitive, or classified informa-
11 tion.

12 (d) TRANSPARENCY.—The Administrator shall pub-
13 licly disclose on the Administration’s website and make
14 available in a searchable format each Space Act Agree-
15 ment, with appropriate redactions for proprietary, sen-
16 sitive, or classified information, not later than 60 days
17 after such agreement is signed.

18 (e) ANNUAL REPORT.—

19 (1) REQUIREMENT.—Not later than 90 days
20 after the end of each fiscal year, the Administrator
21 shall submit to the Committee on Science, Space,
22 and Technology of the House of Representatives and
23 the Committee on Commerce, Science, and Trans-
24 portation of the Senate a report on the use of Space

1 Act Agreement authority by the Administration dur-
2 ing the previous fiscal year.

3 (2) CONTENTS.—The report shall include for
4 each Space Act Agreement in effect at the time of
5 the report—

6 (A) an indication of whether the agreement
7 is a reimbursable, nonreimbursable, or funded
8 Space Act Agreement;

9 (B) a description of—

10 (i) the subject and terms;

11 (ii) the parties;

12 (iii) the responsible—

13 (I) mission directorate;

14 (II) center; or

15 (III) headquarters element;

16 (iv) the value;

17 (v) the extent of the cost sharing
18 among Federal Government and non-Fed-
19 eral sources;

20 (vi) the time period or schedule; and

21 (vii) all milestones; and

22 (C) an indication of whether the agreement
23 was renewed during the previous fiscal year.

24 (3) ANTICIPATED AGREEMENTS.—The report
25 shall also include a list of all anticipated reimburs-

1 able, nonreimbursable, and funded Space Act Agree-
2 ments for the upcoming fiscal year.

3 (4) CUMULATIVE PROGRAM BENEFITS.—The
4 report shall also include, with respect to the Space
5 Act Agreements covered by the report, a summary
6 of—

7 (A) the technology areas in which research
8 projects were conducted under such agreements;

9 (B) the extent to which the use of the
10 Space Act Agreements—

11 (i) has contributed to a broadening of
12 the technology and industrial base avail-
13 able for meeting Administration needs; and

14 (ii) has fostered within the technology
15 and industrial base new relationships and
16 practices that support the United States;
17 and

18 (C) the total amount of value received by
19 the Federal Government during the fiscal year
20 pursuant to such Space Act Agreements.

21 **SEC. 713. HUMAN SPACEFLIGHT ACCIDENT INVESTIGA-**
22 **TIONS.**

23 Section 70702(a) of title 51, United States Code, is
24 amended by striking paragraph (3) and inserting the fol-
25 lowing:

1 “(3) any other orbital or suborbital space vehi-
2 cle carrying humans—

3 “(A) that is owned by the Federal Govern-
4 ment; or

5 “(B) that is being used pursuant to a con-
6 tract or Space Act Agreement, as defined in
7 section 2 of the National Aeronautics and
8 Space Administration Authorization Act for
9 2016 and 2017, with the Federal Government
10 for carrying a researcher or payload funded by
11 the Federal Government; or”.

12 **SEC. 714. FULLEST COMMERCIAL USE OF SPACE.**

13 (a) REPORT.—Not later than 90 days after the date
14 of enactment of this Act, the Administrator shall transmit
15 to the Committee on Science, Space, and Technology of
16 the House of Representatives and the Committee on Com-
17 merce, Science, and Transportation of the Senate a report
18 on current and continuing efforts by the Administration
19 to “seek and encourage, to the maximum extent possible,
20 the fullest commercial use of space,” as described in sec-
21 tion 20102(c) of title 51, United States Code.

22 (b) ELEMENTS.—The report required under sub-
23 section (a) shall include—

24 (1) an assessment of the Administration’s ef-
25 forts to comply with the policy;

1 (2) an explanation of criteria used to define
2 compliance;

3 (3) a description of programs, policies, and ac-
4 tivities the Administration is using, and will continue
5 to use, to ensure compliance;

6 (4) an explanation of how the Administration
7 could expand on the efforts to comply; and

8 (5) a summary of all current and planned ac-
9 tivities pursuant to this policy.

10 (c) BARRIERS TO FULLEST COMMERCIAL USE OF
11 SPACE.—Not later than 90 days after the date of enact-
12 ment of this Act, the Administrator shall transmit to the
13 Committee on Science, Space, and Technology of the
14 House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate a report
16 on current and continuing efforts by the Administration
17 to reduce impediments, bureaucracy, redundancy, and
18 burdens to ensure the fullest commercial use of space as
19 required by section 20102(c) of title 51, United States
20 Code.

21 **SEC. 715. ORBITAL DEBRIS.**

22 (a) FINDINGS.—Congress finds that orbital debris
23 poses serious risks to the operational space capabilities of
24 the United States and that an international commitment
25 and integrated strategic plan are needed to mitigate the

1 growth of orbital debris wherever possible. Congress finds
2 the delay in the Office of Science and Technology Policy’s
3 submission of a report on the status of international co-
4 ordination and development of mitigation strategies to be
5 inconsistent with such risks.

6 (b) REPORTS.—

7 (1) COORDINATION.—Not later than 90 days
8 after the date of enactment of this Act, the Adminis-
9 trator shall provide the Committee on Science,
10 Space, and Technology of the House of Representa-
11 tives and the Committee on Commerce, Science, and
12 Transportation of the Senate with a report on the
13 status of efforts to coordinate with countries within
14 the Inter-Agency Space Debris Coordination Com-
15 mittee to mitigate the effects and growth of orbital
16 debris as required by section 1202(b)(1) of the Na-
17 tional Aeronautics and Space Administration Au-
18 thorization Act of 2010 (42 U.S.C. 18441(b)(1)).

19 (2) MITIGATION STRATEGY.—Not later than 90
20 days after the date of enactment of this Act, the Di-
21 rector of the Office of Science and Technology Policy
22 shall provide the Committee on Science, Space, and
23 Technology of the House of Representatives and the
24 Committee on Commerce, Science, and Transpor-
25 tation of the Senate with a report on the status of

1 the orbital debris mitigation strategy required under
2 section 1202(b)(2) of the National Aeronautics and
3 Space Administration Authorization Act of 2010 (42
4 U.S.C. 18441(b)(2)).

5 **SEC. 716. REVIEW OF ORBITAL DEBRIS REMOVAL CON-**
6 **CEPTS.**

7 (a) SENSE OF CONGRESS.—It is the sense of Con-
8 gress that the amount of orbital debris in low-Earth orbit
9 poses risks for human activities and robotic spacecraft and
10 that this debris may increase due to collisions between ex-
11 isting debris objects. Understanding options to address
12 and remove orbital debris is important for ensuring safe
13 and effective spacecraft operations in low-Earth orbit.

14 (b) REVIEW.—The Administrator, in collaboration
15 with other relevant Federal agencies, shall solicit and re-
16 view concepts and technological options for removing or-
17 bital debris from low-Earth orbit. The solicitation and re-
18 view shall also address the requirements for and feasibility
19 of developing and implementing each of the options.

20 (c) TRANSMITTAL.—Not later than 270 days after
21 the date of enactment of this Act, the Administrator shall
22 provide a report to the Committee on Science, Space, and
23 Technology of the House of Representatives and the Com-
24 mittee on Commerce, Science, and Transportation of the

1 Senate on the solicitation and review required under sub-
2 section (b).

3 **SEC. 717. USE OF OPERATIONAL COMMERCIAL SUB-**
4 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
5 **OPMENT, AND EDUCATION.**

6 (a) POLICY.—The Administrator shall develop a pol-
7 icy on the use of operational commercial reusable sub-
8 orbital flight vehicles for carrying out scientific and engi-
9 neering investigations and educational activities.

10 (b) PLAN.—The Administrator shall prepare a plan
11 on the Administration’s use of operational commercial re-
12 usable suborbital flight vehicles for carrying out scientific
13 and engineering investigations and educational activities.
14 The plan shall—

15 (1) describe the purposes for which the Admin-
16 istration intends to use such vehicles;

17 (2) describe the processes required to support
18 such use, including the criteria used to determine
19 which scientific and engineering investigations and
20 educational activities are selected for a suborbital
21 flight;

22 (3) describe Administration, space flight oper-
23 ator, and supporting contractor responsibilities for
24 developing standard payload interfaces and con-
25 ducting payload safety analyses, payload integration

1 and processing, payload operations, and safety as-
2 surance for Administration-sponsored space flight
3 participants, among other functions required to fly
4 Administration-sponsored payloads and space flight
5 participants on operational commercial suborbital ve-
6 hicles;

7 (4) identify Administration-provided hardware,
8 software, or services that may be provided to com-
9 mercial reusable suborbital space flight operators on
10 a cost-reimbursable basis, through agreements or
11 contracts entered into under section 20113(e) of
12 title 51, United States Code; and

13 (5) describe the United States Government and
14 space flight operator responsibilities for liability and
15 indemnification with respect to commercial sub-
16 orbital vehicle flights that involve Administration-
17 sponsored payloads or activities, Administration-sup-
18 ported space flight participants, or other Adminis-
19 tration-related contributions.

20 (c) ASSESSMENT OF CAPABILITIES AND RISKS.—The
21 Administrator shall assess and characterize the potential
22 capabilities and performance of commercial reusable sub-
23 orbital vehicles for addressing scientific research, includ-
24 ing research requiring access to low-gravity and micro-
25 gravity environments, for carrying out technology dem-

1 onstrations related to science, exploration, or space oper-
2 ations requirements, and for providing opportunities for
3 educating and training space scientists and engineers,
4 once those vehicles become operational. The assessment
5 shall also characterize the risks of using potential commer-
6 cial reusable suborbital flights to Administration-spon-
7 sored researchers and scientific investigations and flight
8 hardware.

9 (d) TRANSMITTAL.—Not later than 1 year after the
10 date of enactment of this Act, the Administrator shall
11 transmit the plan and assessment described in subsections
12 (b) and (c) to the Committee on Science, Space, and Tech-
13 nology of the House of Representatives and the Committee
14 on Commerce, Science, and Transportation of the Senate.

15 (e) ANNUAL PROGRESS REPORTS.—In conjunction
16 with the Administration’s annual budget request justifica-
17 tion for each fiscal year, the Administrator shall transmit
18 a report to the Committee on Science, Space, and Tech-
19 nology of the House of Representatives and the Committee
20 on Commerce, Science, and Transportation of the Senate
21 describing progress in carrying out the Commercial Reus-
22 able Suborbital Research Program, including the number
23 and type of suborbital missions planned in each fiscal
24 year.

1 (f) INDEMNIFICATION AND LIABILITY.—The Admin-
2 istrator shall not proceed with a request for proposals,
3 award any contract, commit any United States Govern-
4 ment funds, or enter into any other agreement for the pro-
5 vision of a commercial reusable suborbital vehicle launch
6 service for an Administration-sponsored spaceflight partic-
7 ipant until transmittal of the plan and assessment speci-
8 fied in subsections (b) and (c), the liability issues associ-
9 ated with the use of such systems by the United States
10 Government have been addressed, and the liability and in-
11 demnification provisions that are planned to be included
12 in such contracts or agreements have been provided to the
13 Committee on Science, Space, and Technology of the
14 House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate.

16 **SEC. 718. FUNDAMENTAL SPACE LIFE AND PHYSICAL**
17 **SCIENCES RESEARCH.**

18 (a) SENSE OF CONGRESS.—It the sense of Congress
19 that fundamental, discovery-based space life and physical
20 sciences research is critical for enabling space exploration,
21 protecting humans in space, and providing societal bene-
22 fits, and that the space environment facilitates the ad-
23 vancement of understanding of the life sciences and phys-
24 ical sciences. Space life and physical science research con-
25 tributes to advancing science, technology, engineering, and

1 mathematics research, and provides careers and training
2 opportunities in academia, Federal laboratories, and com-
3 mercial industry. Congress encourages the Administrator
4 to augment discovery-based fundamental research and to
5 establish requirements reflecting the importance of such
6 research in keeping with the priorities established in the
7 National Academies' decadal survey entitled "Recapturing
8 a Future for Space Exploration: Life and Physical
9 Sciences Research for a New Era".

10 (b) BUDGET REQUEST.—The Administrator shall in-
11 clude as part of the Administration's annual budget re-
12 quest for each fiscal year a budget line for fundamental
13 space life and physical sciences research, devoted to com-
14 petitive, peer-reviewed grants, that is separate from the
15 International Space Station Operations account.

16 (c) STRATEGIC PLAN.—

17 (1) DEVELOPMENT.—The Administrator, in
18 consultation with academia, other Federal agencies,
19 and other potential stakeholders, shall develop a
20 strategic plan for carrying out competitive, peer-re-
21 viewed fundamental space life science and physical
22 sciences and related technology research, among
23 other activities, consistent with the priorities in the
24 National Academies' decadal survey described in
25 subsection (a).

1 (2) TRANSMITTAL.—Not later than 270 days
 2 after the date of enactment of this Act, the Adminis-
 3 trator shall transmit the strategic plan developed
 4 under paragraph (1) to the Committee on Science,
 5 Space, and Technology of the House of Representa-
 6 tives and the Committee on Commerce, Science, and
 7 Transportation of the Senate.

8 **SEC. 719. RESTORING COMMITMENT TO ENGINEERING RE-**
 9 **SEARCH.**

10 (a) SENSE OF CONGRESS.—It is the sense of Con-
 11 gress that engineering excellence has long been a hallmark
 12 of the Administration’s ability to make significant ad-
 13 vances in aeronautics and space exploration. However, as
 14 has been noted in recent National Academies reports, in-
 15 creasingly constrained funding and competing priorities
 16 have led to an erosion of the Administration’s commitment
 17 to basic engineering research. This research provides the
 18 basis for the technology development that enables the Ad-
 19 ministration’s many challenging missions to succeed. If
 20 current trends continue, the Administration’s ability to at-
 21 tract and maintain the best and brightest engineering
 22 workforce at its Centers as well as its ability to remain
 23 on the cutting edge of aeronautical and space technology
 24 will continue to erode and will threaten the Administra-

1 tion's ability to be a world leader in aeronautics research
2 and development and space exploration.

3 (b) PLAN.—The Administrator shall develop a plan
4 for restoring a meaningful basic engineering research pro-
5 gram at the Administration's Centers, including, as appro-
6 priate, collaborations with industry, universities, and other
7 relevant organizations. The plan shall identify the organi-
8 zational approach to be followed, an initial set of basic
9 research priorities, and a proposed budget.

10 (c) REPORT.—Not later than 180 days after the date
11 of enactment of this Act, the Administrator shall transmit
12 the plan specified in subsection (b) to the Committee on
13 Science, Space, and Technology of the House of Rep-
14 resentatives and the Committee on Commerce, Science,
15 and Transportation of the Senate.

16 **SEC. 720. LIQUID ROCKET ENGINE DEVELOPMENT PRO-**
17 **GRAM.**

18 The Administrator shall consult with the Secretary
19 of Defense to ensure that any next generation liquid rock-
20 et engine made in the United States for national security
21 space launch objectives can contribute, to the extent prac-
22 ticable, to the space programs and missions carried out
23 by the Administration.

1 **SEC. 721. REMOTE SATELLITE SERVICING DEMONSTRATIONS.**
2 **TIONS.**

3 (a) SENSE OF CONGRESS.—It is the sense of Con-
4 gress that—

5 (1) the Administration plays a key role in dem-
6 onstrating the feasibility of using robotic tech-
7 nologies for a spacecraft that could autonomously
8 access, inspect, repair, and refuel satellites;

9 (2) demonstrating this feasibility would both as-
10 sist the Administration in its future missions and
11 provide other Federal agencies and private sector en-
12 tities with enhanced confidence in the feasibility to
13 robotically refuel, inspect, repair, and maintain their
14 satellites in both near and distant orbits; and

15 (3) the capability to refuel, inspect, repair, and
16 maintain satellites robotically could add years of
17 functional life to satellites.

18 (b) REPORT.—Not later than 120 days after the date
19 of enactment of this Act, the Administrator shall transmit
20 a report to the Committee on Science, Space, and Tech-
21 nology of the House of Representatives and the Committee
22 on Commerce, Science, and Transportation of the Senate
23 describing the Administration's—

24 (1) activities, tools, and techniques associated
25 with the ultimate goal of autonomously servicing sat-
26 ellites using robotic spacecraft;

1 (2) efforts to coordinate its technology develop-
2 ment and demonstrations with other Federal agen-
3 cies and private sector entities that conduct pro-
4 grams, projects, or activities on on-orbit satellite in-
5 spection and servicing capabilities;

6 (3) efforts to leverage the work of these Federal
7 agencies and private sector entities into the Admin-
8 istration's plans;

9 (4) accomplishments to date in demonstrating
10 various servicing technologies;

11 (5) major technical and operational challenges
12 encountered and mitigation measures taken; and

13 (6) demonstrations needed to increase con-
14 fidence in the use of the technologies for operational
15 missions, and the timeframe for these demonstra-
16 tions.

17 **SEC. 722. INFORMATION TECHNOLOGY GOVERNANCE.**

18 (a) SENSE OF CONGRESS.—It is the sense of Con-
19 gress that information security is central to the Adminis-
20 tration's ability to protect information and information
21 systems vital to its mission.

22 (b) STUDY.—The Comptroller General of the United
23 States shall conduct a study to assess the effectiveness of
24 the Administration's Information Technology Governance.
25 The study shall include an assessment of—

1 (1) the resources available for overseeing Ad-
2 ministration-wide information technology operations,
3 investments, and security measures and the Chief
4 Information Officer’s visibility into and access to
5 those resources;

6 (2) the effectiveness of the Administration’s de-
7 centralized information technology structure, deci-
8 sionmaking processes and authorities and its ability
9 to enforce information security; and

10 (3) the impact of providing the Chief Informa-
11 tion Officer approval authority over information
12 technology investments that exceed a defined mone-
13 tary threshold and any potential impacts of the
14 Chief Information Officer having such authority on
15 the Administration’s missions, flights programs and
16 projects, research activities, and Center operations.

17 (c) REPORT.—Not later than 1 year after the date
18 of enactment of this Act, the Comptroller General shall
19 transmit a report detailing the results of the study con-
20 ducted under subsection (b) to the Committee on Science,
21 Space, and Technology of the House of Representatives
22 and the Committee on Commerce, Science, and Transpor-
23 tation of the Senate.

1 **SEC. 723. STRENGTHENING ADMINISTRATION SECURITY.**

2 (a) FINDINGS.—Congress makes the following find-
3 ings:

4 (1) Following the public disclosure of security
5 and export control violations at its research centers,
6 the Administration contracted with the National
7 Academy of Public Administration to conduct an
8 independent assessment of how the Administration
9 carried out Foreign National Access Management
10 practices and other security matters.

11 (2) The assessment by the National Academy of
12 Public Administration concluded that “NASA net-
13 works are compromised”, that the Administration
14 lacked a standardized and systematic approach to
15 export compliance, and that individuals within the
16 Administration were not held accountable when
17 making serious, preventable errors in carrying out
18 Foreign National Access Management practices and
19 other security matters.

20 (b) REPORT.—Not later than 90 days after the date
21 of enactment of this Act, the Administration shall report
22 to the Committee on Science, Space, and Technology of
23 the House of Representatives and the Committee on Com-
24 merce, Science, and Transportation of the Senate on how
25 it plans to address each of the recommendations made in
26 the security assessment by the National Academy of Pub-

1 lic Administration and the recommendations made by the
2 Government Accountability Office and the Administra-
3 tion's Office of the Inspector General regarding security
4 and safeguarding export control information.

5 (c) REVIEW.—Not later than 1 year after the date
6 of enactment of this Act, the Comptroller General of the
7 United States shall report to the Committee on Science,
8 Space, and Technology of the House of Representatives
9 and the Committee on Commerce, Science, and Transpor-
10 tation of the Senate its assessment of how the Administra-
11 tion has complied with the recommendations described in
12 subsection (b).

13 **SEC. 724. PROHIBITION ON USE OF FUNDS FOR CONTRAC-**
14 **TORS THAT HAVE COMMITTED FRAUD OR**
15 **OTHER CRIMES.**

16 None of the funds authorized to be appropriated or
17 otherwise made available for fiscal year 2016 or any fiscal
18 year thereafter for the Administration may be used to
19 enter into a contract with any offeror or any of its prin-
20 cipals if the offeror certifies, pursuant to the Federal Ac-
21 quisition Regulation, that the offeror or any of its prin-
22 cipals—

23 (1) within a 3-year period preceding the offer
24 has been convicted of or had a civil judgment ren-
25 dered against it for—

1 (A) commission of fraud or a criminal of-
2 fense in connection with obtaining, attempting
3 to obtain, or performing a public (Federal,
4 State, or local) contract or subcontract;

5 (B) violation of Federal or State antitrust
6 statutes relating to the submission of offers; or

7 (C) commission of embezzlement, theft,
8 forgery, bribery, falsification or destruction of
9 records, making false statements, tax evasion,
10 violating Federal criminal tax laws, or receiving
11 stolen property;

12 (2) are presently indicted for, or otherwise
13 criminally or civilly charged by a governmental enti-
14 ty with, commission of any of the offenses enumer-
15 ated in paragraph (1); or

16 (3) within a 3-year period preceding the offer,
17 has been notified of any delinquent Federal taxes in
18 an amount that exceeds \$3,000 for which the liabil-
19 ity remains unsatisfied.

20 **SEC. 725. PROTECTION OF APOLLO LANDING SITES.**

21 (a) ASSESSMENT.—The Director of the Office of
22 Science and Technology Policy, in consultation with all rel-
23 evant agencies of the Federal Government and other ap-
24 propriate entities and individuals, shall carry out a review
25 and assessment of the issues involved in protecting and

1 preserving historically important Apollo Program lunar
2 landing sites and Apollo program artifacts residing on the
3 lunar surface, including those pertaining to Apollo 11 and
4 Apollo 17. The review and assessment shall, at a min-
5 imum, include determination of what risks to the protec-
6 tion and preservation of those sites and artifacts exist or
7 may exist in the future, what measures are required to
8 ensure such protection and preservation, the extent to
9 which additional domestic legislation or international trea-
10 ties or agreements will be required, and specific rec-
11 ommendations for protecting and preserving those lunar
12 landing sites and artifacts.

13 (b) REPORT.—Not later than 1 year after the date
14 of enactment of this Act, the Director shall transmit to
15 the Committee on Science, Space, and Technology of the
16 House of Representatives and the Committee on Com-
17 merce, Science, and Transportation of the Senate the re-
18 sults of the assessment required under subsection (a).

19 **SEC. 726. ASTRONAUT OCCUPATIONAL HEALTHCARE.**

20 (a) IN GENERAL.—The National Academies’ Insti-
21 tute of Medicine report “Health Standards for Long Du-
22 ration and Exploration Spaceflight: Ethics Principles, Re-
23 sponsibilities, and Decision Framework” found that the
24 Administration has ethical responsibilities for and should
25 adopt policies and processes related to health standards

1 for long duration and exploration spaceflights that recog-
2 nize those ethical responsibilities. In particular, the report
3 recommended that the Administration “provide preventa-
4 tive long-term health screening and surveillance of astro-
5 nauts and lifetime health care to protect their health, sup-
6 port ongoing evaluation of health standards, improve mis-
7 sion safety, and reduce risks for current and future astro-
8 nauts”.

9 (b) RESPONSE.—The Administration shall prepare a
10 response to the National Academies report recommenda-
11 tion described in subsection (a). The response shall include
12 the estimated budgetary resources required for the imple-
13 mentation of those recommendations, and any options that
14 might be considered as part of the response.

15 (c) TRANSMITTAL.—The response required under
16 subsection (b) shall be transmitted to the Committee on
17 Science, Space, and Technology of the House of Rep-
18 resentatives and the Committee on Commerce, Science,
19 and Transportation of the Senate not later than 6 months
20 after the date of enactment of this Act.

21 **SEC. 727. SENSE OF CONGRESS ON ACCESS TO OBSERVA-**
22 **TIONAL DATA SETS.**

23 It is the sense of Congress that the Administration
24 should prioritize the development of tools and interfaces
25 that make publicly available observational data sets more

1 easy to access, analyze, manipulate, and understand for
2 students, teachers, and the American public at large, with
3 a particular focus on K–12 and undergraduate STEM
4 education settings.

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